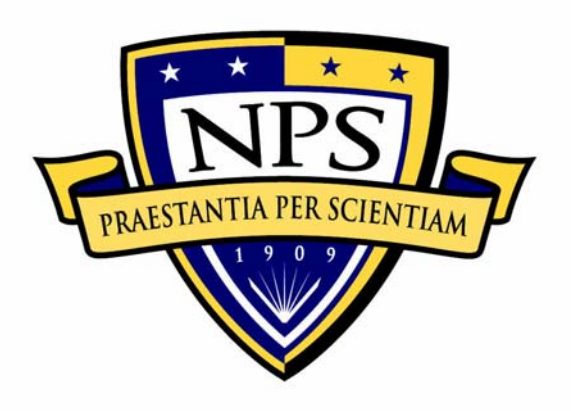

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

AN ANALYSIS OF JUNIOR OFFICER PERFORMANCE AT THE SURFACE WARFARE OFFICER SCHOOL DIVISION OFFICER COURSE

by

Michael R. Vaas

June 2004

Thesis Advisor:	Janice Laurence
Second Reader:	Alice Crawford

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The Surface Warfare Officer community has begun a series of fundamental changes in the methods used to train junior officers. Since 1970, newly commissioned officers reported to the Surface Warfare Officers School(SWOS) to attend the Division Officer Course. This school was designed to expose and educate prospective division officers to the tasks and equipment they would be expected to manage once they reported to their first ship. The majority of the material from this classroom training will now be completed onboard ship, using computer-based training and Personnel Qualification Standards(PQS). This study will examine junior officer performance at the previous SWOS Division Officer Course. Specifically it will identify areas where newly commissioned officers have had difficulty in the past and, using selected background variables, predict the performance of various groups under the new training regime. The secondary objective is to create a model to predict areas in the curriculum that cause problems for certain groups.

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AN ANALYSIS OF JUNIOR OFFICER PERFORMANCE AT THE SURFACE WARFARE OFFICER SCHOOL DIVISION OFFICER COURSE

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requirements for the degree of

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ABSTRACT

The Surface Warfare Officer community has begun a series of fundamental changes in the methods used to train junior officers. Since 1970, newly commissioned officers reported to the Surface Warfare Officer's School(SWOS) to attend the Division Officer Course. This school was designed to expose and educate prospective division officers to the tasks and equipment they would be expected to manage once they reported to their first ship. The majority of the material from this classroom training will now be completed onboard ship, using computer-based training and Personnel Qualification Standards(PQS). This study will examine junior officer performance at the previous SWOS Division Officer Course. Specifically it will identify areas where newly commissioned officers have had difficulty in the past and, using selected background variables, predict the performance of various groups under the new training regime. The secondary objective is to create a model to predict areas in the curriculum that cause problems for certain groups.

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TABLE OF CONTENTS

LIST OF TABLES

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I. INTRODUCTION

This study examines academic performance of students at the Surface Warfare Officer School's Division Officer Course (SWOSDOC). The Surface Warfare Officer (SWO) community has begun a series of fundamental changes in the methods of training its junior officers. Starting in December of 2002, the traditional classroom program in place at the Division Officer Course at the Surface Warfare Officer's School was replaced by a new shipboard curriculum rooted in computer-based learning and on-the-job training (OJT). The objective of this study is to review historical data on the academic performance of students in the classroom training at SWOSDOC. The study looks at the relationship between various background characteristics, such as commissioning program and performance at SWOSDOC to provide one more point of view into the perennial issue of the value of the Navy's commissioning programs. The recent change in training regime does not negate the value of performance comparison of accession sources. The goal is to use the estimated relationship to improve either pre-commissioning or shipboard training for junior officers in the Surface Warfare community.

A. BACKGROUND

The Surface Warfare Officer School was established in 1970 at the Naval Education and Training Center in Newport, Rhode Island. The initial success prompted expansion of the scope of the training program and the formation of a second school in Coronado, California in 1973. In the post-Cold War era of drawdown and consolidation, the West Coast school was closed and all training was centralized in

Rhode Island. Over time, SWOS has grown and been refined into several stages, from the basic Division Officer Course to the advanced Prospective Commanding Officer Course. SWOS also offers several courses for specific billet and/or collateral duty training.

Historically, newly commissioned officers reported immediately to the Surface Warfare Officer's School to attend the Division Officer Course as part of their preparation for entering the fleet. Over the course of six months, students learned Navigation, Administration, Weapons Systems, Damage Control, Engineering, and Basic Leadership. Following their graduation, they either reported directly to their first operational command or continued on to a more specialized school.

To reduce costs associated with change of station (PCS) moves, give Commanding Officer's more influence and control over training, and decrease the time needed to reach the SWO qualification, a new system was implemented in January 2003. As of that date, all newly commissioned officers report directly to the fleet. Once aboard their first ship they do not immediately take over as a division officer. Instead, they are placed in a training division or become an assistant to another qualified division officer. They begin a course of computer-based training backed up by on-the-job training reinforced with Personnel Qualification Standards (PQS) with their mentors. Once they have reached a specified point in their training, the ship's Commanding Officer sends them to Surface Warfare Officer's School, but only for a month of temporary duty. While at SWOS, they spend their time in the shiphandling simulators and in intense navigation and rules of the road

classroom study. The goal of this change is that they will be able to return to their ship and quickly earn their final Officer of the Deck (OOD) qualification and then earn their Surface Warfare Officer (SWO) qualification (pin).

This drastic change in training method is intended to reduce costs, train junior officers to be better watchstanders and mariners, and provide ships with qualified Surface Warfare Officers for longer periods during their initial tours of duty. The new training system will reduce cost by eliminating the 6-8 months that newly commissioned officers formerly spent in "schoolhouse" training. It will also eliminate the costs associated with a second PCS move that came from transferring from SWOS out to the fleet.

B. OBJECTIVE

The objective of this thesis is to analyze historical data from the Division Officer Course to identify areas where newly commissioned officers have had difficulty in the past. This study will focus mainly on the three major accession sources – the United States Naval Academy (USNA), Naval Reserve Officer Training Corps (NROTC), and Officer Candidate School (OCS). The new computer-based curriculum will be very similar to the classroom taught syllabus with the exception that it is individually tailored and self-paced. This thesis will investigate the possibility that an ensign has a risk of falling behind or being a "late bloomer" in the new training system. By examining commissioning program performance in the SWOSDOC classroom to inform SWOS as to which newly commissioned officers might struggle, those officers can be targeted early on to keep them on pace to qualify. It is likely that

individuals who encountered difficulties under the old method of instruction will encounter similar problems under the new method. Thus this study may be useful in predicting the performance of various groups under the new training regime. The secondary objective is to create a model to predict areas in the curriculum that cause problems for certain groups.

C. SCOPE AND LIMITATIONS

This study is based on a limited sample of Division Officer Course graduates, with 3023 students from 27 classes at SWOSDOC examined based on their performance on standardized unit exams.

The data set does not account for those students whose exam performance was so poor that they were placed in extra instruction (EI) and completed their course of study by retaking any unit that they failed. Also, no one ever truly failed out of the Division Officer Course. After three unsatisfactory unit exam scores, an individual was assessed by the Academic Officer. Individuals who were not performing to the minimum levels were remediated by being disenrolled from their current class, “rolled back” and made to start the curriculum over with the next class. Without this information, we are left with each student’s best score vice their level of knowledge at the end of instruction for each unit. Although the goal of training is the mastery of knowledge, any student who must go back and augment their learning increases the man-hours spent training, both for the instructor and the student.

D. ORGANIZATION

This study is organized into five chapters. This chapter has provided the background and focus of the study.

Chapter II reviews the traditional and proposed methods of Surface Warfare Officer training and looks at Navy Officer commissioning programs. Chapter III describes the data used for this study, the research methodology utilized, and the variables used and assumptions made in this study. Chapter IV describes the statistical results of the study. Chapter V contains conclusions based on the research and recommendations based on the results and for further research.

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II. LITERATURE REVIEW

A. THE PROFESSIONAL CORE COMPETENCIES (PCC) MANUAL FOR OFFICER ACCESSION PROGRAMS

The Chief of Naval Education and Training maintains an instruction known as the Professional Core Competencies (PCC) Manual. The purpose of this instruction is to create a common foundation for the training that is conducted at each of the different officer accession programs, allowing all of them to meet the minimum levels of education required by the fleet. The letter of promulgation for the PCC Manual states:

> All naval officer accession programs are designed to produce officers with a basic knowledge of the naval profession and to enhance moral, mental, and physical development. The goal is to instill in each graduate the highest ideals of honor, courage and commitment and to prepare them to assume the highest responsibilities of military service and command.

The letter of promulgation goes on to stress that the competencies are only the minimum professional training requirements for officer accession programs. It encourages the programs to expand the breadth and depth of their training as much as their time and resources will allow.

The bulk of the PCC Manual contains the statements that define each of the core competencies and also several appendices that adjust and/or augment the requirements for several of the officer commissioning programs. The core competencies are broken down into seven major areas:

1. Academic Preparation
2. Leadership and Management

3. Orientation and Naval Science
4. Sea Power and Maritime Strategy
5. Technical Foundations
6. Shipkeeping, Navigation, and Seamanship
7. Personal and Personnel Excellence and Fitness

There are broad requirements laid out for each of these major areas. The PCC Manual does not go into specifics as to how the accession sources are to meet these requirements. There are places in the major areas where the PCC Manual waives or adds requirements for certain accession programs based on the program's design. However, the desired end-state for a major area is never compromised. All officers commissioned in the Naval Service are required to have the training specified in the PCC Manual and to meet the established standards of each program.

B. OFFICER ACCESSION SOURCES

There are three major accession sources from which the Navy and the Surface Warfare Community draw the majority of their officers – the United States Naval Academy, the Naval Reserve Officers Training Corps, and the Officer Candidate School. The three have existed continuously to meet the needs of the naval service since the adoption of the Holloway Plan by Congress in 1946. Each trains its midshipmen differently and each serves a unique purpose for the Navy. The Naval Academy was designed as a Naval School to provide a core of officers who have both the academic and military education to become the career officers for the Navy. NROTC was designed to provide the bulk of new officer accessions for the Navy and to broaden the

educational base of the officer corps. Officer Candidate School was created to secure a continuing supply of fully qualified officers for the Navy to ensure flexibility adequate to meet any need or emergency.

Each commissioning program trains its midshipmen by its own program. The Naval Academy is a continuous 4 year education where midshipmen are on active duty throughout. Their academic, military and moral education are intertwined and scheduled over their daily existence. NROTC provides scholarships at civilian institutions that pay a midshipman's tuition, books, and other fees. They participate in classes taught by Naval Officers and spend parts of their summers completing training with operational units. Officer Candidate School is a 13 week program designed to provide graduates with a working knowledge of the Navy and prepare them for the responsibilities of a Naval Officer.

1. Officer Accession Program Performance

The most common method of examining the effect of officer training is to analyze performance after commissioning. Several studies including Foster(1990), Nolan(1993), and Heidt and Zajkowski(1982) have examined performance and productivity of officers in various communities who entered the Navy via different commissioning programs. They all use outcomes like promotion, retention, and success at follow-on training as their measures of effectiveness. Although all of these outcomes are important, performance at specialty training schools provides and important and immediate look at how well an accession source is preparing its students for Navy-specific training. With regards to this criterion,

there has not been a lot of research that focuses specifically on the performance of officers from all accession sources. However, there has been a study done on the performance of NROTC program graduates at SWOSDOC. Chapman (1992) did a comprehensive review of NROTC performance at SWOS in response to the scholarship reduction that occurred as part of the draw down at the end of the Cold War. His study examines NROTC student performance by looking at mean scores on unit exams and by comparing performance differences based on college attended, college major, SWOSDOC class and accession source. When comparing accession sources the differences in average scores were often not statistically significant.

There have been previous studies that analyzed issues such as productivity and training costs based on accession source. There are several ways of examining both of these criteria. Foster(1990) studied officer productivity for all warfare specialties using outcome measures based on performance ratings and promotion recommendations. He found that USNA graduates were more likely to be rated superior performers then graduates of other commissioning programs. USNA graduates were also recommended for early promotion at higher rates than other graduates. (Foster 1990, 47) However, differences in mean values of these outcomes were not generally significant so that he was not able to conclude that all officers with United States Naval Academy commissions are superior to officers from other commissioning sources.

2. Officer Accession Program Cost

Studies like Foster’s(1990) are tempered by others that analyze the cost of training officers from each

accession source. There have been several studies on the amount of money that it costs to train officers from different accession sources. These studies began in the early 1990s as the end of the Cold War and the subsequent military drawdown precipitated drastic personnel reductions. One of the first studies was conducted by Strano(1990). He recognized that current events would lead Congressional and Department of Defense leadership to address means with which to reduce officer end-strength. Strano conducted a cost analysis of the three major accession sources in an attempt to give manpower planners an accurate tool to gauge how much money would be saved by changes in accessions. Specifically, he looked at the total cost, variable cost, fixed costs, and marginal cost of graduates from each commissioning program. He discovered that compared to NROTC and OCS, the Naval Academy had a much higher proportion of fixed costs (faculty, facilities, messing, medical, etc…). This meant that by using marginal cost, the estimated savings from a reduction of the Naval Academy by 200 midshipmen would be approximately one third of what the perceived savings were using average cost. The Naval Academy was still the most expensive accession source per graduate, but when using marginal cost instead of average cost, it is not as disparate.

The thread of looking at average cost was pulled further in 1995 by Bowman. He believed that other studies were limited because they only looked at training costs and ignored long-term economic returns. He developed a model based on maintaining a given end strength of officers and looked at the three major accession sources. What he

concluded was that the Naval Academy and NROTC programs justified their higher initial price tag because graduates form these sources were more likely to stay longer and to promote at higher rates earlier in zone. This reduced turnover costs related to officer separations and allows the Navy to maintain its manning levels at higher pay grades. Bowman did not believe that these programs produced better officers then OCS, but did see them as a screening mechanism that advantaged the Navy. He advocated continued use of all accession sources to maintain the balance envisioned in the Holloway Plan.

Bernard(2002) completed a follow-on analysis from Bowman's initial study. He updated the retention and promotion models and found that although overall ROTC accessions were more likely to remain past their minimum service requirement to the O-4 selection board then those from USNA, that when ROTC programs at highly selective colleges were compared with the Naval Academy they were far less likely to stay then USNA graduates. The study also revealed that USNA accessions were more likely to promote to O-4 then the other commissioning programs. Bernard also included a cost analysis that supported Bowman's determination that USNA is the commissioning source that is most cost effective for any increased Officer Commissioning accessions, but that there will continue to be a need to maintain all current commissioning programs as each provides large numbers of commissions to different communities.

C. THE NEW SURFACE WARFARE OFFICER'S SCHOOL

A common misconception about the new SWO training pipeline is that SWOSDOC has gone away completely. SWOSDOC

still exists, but it has been modernized and streamlined. Junior SWO officers are now trained and tracked by SWOSDOC from their entry to the fleet until the time they receive their pin and are qualified as a Surface Warfare Officer.

A recent RAND Corporation study (Yardly, 2003) noted the following about the way the Navy trains:

> One of the great strengths of the Navy is the sharing of information between crew members and their ability to train themselves through this process of information sharing. The Navy trains under way and conducts its mission under way and forward deployed, which provides rich opportunities to support the training environment. This training method has been described by the Navy as "training the way we fight and fighting the way we train." The success of this method remains unchallenged

The Navy is relying upon this to facilitate the new SWOS training regime. The shipboard training portion of the qualification is designed and monitored by SWOSDOC in Newport, RI. The computer-based learning is self-paced and follows along the same areas as the traditional "schoolhouse" education. It is reinforced by PQS and OJT. As junior officers progress through the Division Officer At-Sea Curriculum, they will be tested just as they were at SWOSDOC. They will be exposed to practicums, practical problems, and case studies to reinforce the CBT. In the end they will have completed the Division Officer At-Sea Curriculum and their required PQS before their Commanding Officer sends them to the tailored training at SWOS.

The classroom training portion of the qualification in Newport will be three weeks in duration. The training is designed to imitate underway-shipboard routine to provide officers with the opportunity to refine skills across the

spectrum of the Surface Warfare qualification. It will follow a graduate school level format, which focuses on instructor facilitated/monitored peer learning through group interaction. Training will be centered on practical application of skills to collaborative problem solving. This will be accomplished through the use of simulators, skill demonstrations, practical exercises, case studies and student led seminars. Officers will arrive at SWOS with various experiences and varying degrees of experience and knowledge. SWOS will allow these officers to share their knowledge and experiences in a practical and applied learning environment. (June 2004; https://wwwcfs.cnet.navy.mil/swos/restricted/Doc/transform.cfm)

The overall goal of Tailored SWOSDOC is to verify that each student has received the minimum required skills needed for a SWO and to expose the students to possible situations that they would not normally encounter onboard their ship. Students will also have the ability to interact with one another and learn from each other about other ship capabilities/limitations, procedures, and life in general.

The new Division Officer training program is expected to result in qualifying junior division officers as Surface Warfare Officers more quickly than under the old training regime. Through better training and enhanced learning, the community creates a more rapid and focused SWO qualification process. Gavino(2002) projected a maximum 17 months of shipboard training time for qualification based on a study of year group 1998 SWOS graduates for is cost analysis assessment. This meets an anticipated SWO

qualification in 17 months vice 27 months under the earlier training pipeline. That gives each officer almost an extra 12 months of service as a qualified SWO and greatly advances career development. Gavino also noted that more positive first tour experiences would enhance retention. It also creates more flexibility to allow the Bureau of Personnel to support fleet requirements.

D. PERSONNEL QUALIFICATION STANDARDS

The Surface Warfare Community uses the Personnel Qualification Standards (PQS) system to train and qualify both enlisted and officers. Every PQS consists of three sections – the 100 section (Fundamentals), the 200 section (Systems), and the 300 section (Watchstations). To be qualified to stand a watch, a trainee must earn signatures for the 300 section by reviewing and showing knowledge of different fundamentals and systems covered in the other sections of the PQS. The trainee must also demonstrate proficiency at the watch while standing it under instruction. There are signature blocks in the 300 section that cover all everyday tasks, infrequent tasks, abnormal conditions, and emergencies. Once a trainee has all the signatures for a watchstation, he/she can be qualified to stand that watch without supervision.

PQS are grouped into areas of similarity, such as Damage Control, Small Boat Operations, Deck Watches In Port, or Ship’s Maintenance and Material Management (3-M) System. There are literally hundreds of PQS used throughout the fleet. Each PQS can have numerous watchstations that often piggyback on each other in progression. The basic qualification may be the 301

watchstation. Once that is completed an individual may move on to the 302 watchstation and so on.

With the new Division Officer At Sea Training program PQS will continue to play an integral role in the qualification of junior Surface Warfare Officers. SWOS has traditionally validated all 100 and 200 Section PQS requirements. The new computer-based training is designed to expose students to the same level of information and will also allow those who complete it to validate those PQS signatures.

E. COMPUTER BASED LEARNING

Computer-Based Learning has been studied by the Department of Defense (DOD) since the early 1960's. The advantage of this type of training goes to the root of everything that the DOD wants – it should provide faster, less expensive and less manpower-intensive training that also improves the standards. From flight simulators to Power Point, the military has adapted technology to expand its training capabilities and outcomes.

Seidel and Waddle(1987) compiled a volume that covers all facets of computer-based instruction (CBI) in military environments for both the United States and NATO countries. Where as most of the studies provide an insightful look into specific programs, the overview at the beginning of the book provides a concise summary of the pros and cons of CBI as well as the allure of it to the military. The traditional schoolhouse training has two major drawbacks. The first is a lack of interaction between the instructor and individual student. The second is that the rate of training is set for the perceived "average" student, meaning that learning advances either too fast or too slow

for most of the students. CBI has the ability to increase interaction by individualizing instruction and allowing for a personalized pace for each student, which can both speed up training and raise the quality of the end product.

As traditional training is set for a fixed period, the military benefits from faster training in terms of lower costs for pay and allowances during the time in the formal schoolhouse. Faster training also allows individuals to move on to operational commands where they receive additional experience form OJT and exercise training, benefiting from additional time spent in the operational environment. Computer-based instruction continues to become more attractive as reductions in personnel, resources and training time strain the current programs and there is an ongoing increase in computer and educational software availability.

Forcier(1996) also sees the computer as a productivity tool. Software is primary although hardware also plays an important role by limiting the range of CBI. Software can take many forms, including tutorial, drill and practice, simulation, or interactive multimedia. Forcier sets the following guidelines for creating effective software for CBI:

1. Software must stimulate a high degree of interest in the learner.
2. Software must contribute to developmental learning and thereby increase its permanence.
3. Software must be based in concrete experience to enhance understanding.
4. Software must make optimum use of the visual and, where appropriate, the aural sensory channels to strengthen the reality of the experience.

Forcier does not limit technology to just teaching and learning, he also sees it as a tool for research and management. Any traditional method has the possibility to be adapted to a computer-based program. Ultimately, use of computers will increase productivity because they improve the ability to collect, access, and examine performance information and then use that to improve methodology.

In 1997, RAND Corporation published a study by Winkler and Steinberg that focused on restructuring military training. Although the RAND study focused on the training of Army armored units, the lessons learned may be applicable anywhere in the military. RAND proposed consolidating occupations and shifting from schoolhouse training to formal OJT. To determine the effectiveness of this type of change, three aspects needed to be considered – where individuals are placed, the source of the work, and how much training is shifted.

Technology played a large role in the recommendations of the RAND study. Training aids, devices, simulators and simulations were all considered. The benefits were that when used as substitutes, technology can reduce operating costs. It also reduces training time and cuts training costs in terms of pay and allowances. The drawback to these kinds of changes is that increased OJT creates added burden on field units and a potential initial loss of skills at the unit level that could offset the benefits of reduced training lengths. It was concluded that focus on core skills would limit this drop. However, the bottom line was that skill improvement must justify the method. RAND predicted that the greatest benefits will occur in the first consolidations, particularly regarding cost savings.

F. RETENTION

Although initial training and long-term retention in the Surface Warfare Community may not seem closely related, the shift to shipboard training makes a review of retention studies relevant. Gremillion (1998) studied the impact of undergraduate academic achievement at the United States Naval Academy on fleet performance and retention. He found that academic performance had little to do with either and that family and leadership in sports and community groups were more significant.

Bautista (1996) searched for a correlation between ship type and junior officer separation. He determined that there was no single factor that affected separation but an interrelationship between personal characteristics, ship type and performance that could predict separation. He did find that officers assigned to carriers for their first tour had the highest separation rates. This is no longer a concern as Ensigns are no longer detailed to carriers. Other findings included that officers assigned to a cruiser/destroyer (CRUDES) had the lowest separation rates and that officers on amphibious ships stayed in the Navy but tended to transfer laterally out of the SWO community.

Another analysis of retention in the Surface Warfare Community was done by Duffy(2000). He also found that serving on a cruiser/destroyer initially was conducive to retention. However, he modified this to clarify that frigates, which are traditionally grouped in the CRUDES group, have a lower retention rate. He also found that officers with higher undergraduate GPAs, officers that majored in an engineering disciple, and officers

commissioned via Officer Candidate School were all less likely to remain in the Surface Warfare community past their minimum service requirement.

III. RESEARCH METHODOLOGY

A. DATA BASE

The data used in this study were obtained from the Surface Warfare Officers School Division Officer Course in Newport, Rhode Island. The data base included SWOS DOC class number, SWOS DOC alpha code, sex, ethnicity, commissioning source, college attended, college major, college GPA, follow-on assignment, individual SWOS DOC unit exam scores and the cumulative SWOS DOC GPA.

Originally, the data set contained information for 5323 students. The data for several classes was deleted because of curriculum updates that reordered the units and changed the numbering of the unit exams. Each class was reviewed for accuracy of data and all entries that were incomplete or that included obviously erroneous data were deleted as well. For the purpose of this study, individuals coded as Asian, Filipino, Pacific Islander and American Indian were recoded to be included in the Other Minority ethnicity. All students who were commissioned by programs other than USNA, NROTC, and OCS were removed.

The data provided regarding undergraduate education was recoded to account for two criteria – major type and institutional selectivity. Majors were broken down into two categories, technical and non-technical. Any major related to engineering, math, or science was technical while humanities and liberal arts based majors were non-technical. Selectivity is based upon the median entrance exam scores(SAT and ACT), class rank, and grade point average of applicants selected to a university as well as

the overall percentage of applicants selected for admission. It is not a rating of an institution's academic standards but rather its admissions standards. This standard is based on Barron's Profiles of American Colleges 2003 edition.

The final data set included information on 3023 students who attended SWOSDOC from classes 110 to 137 between July 1994 and March 2000. Table 1 lists the dates for and the number of students in each SWOSDOC class in the final data set. Data for class 133 was unavailable. Table 2 displays the frequencies of the variables that were analyzed for the study. Table 2 shows that the majority of students were white, male, and were commissioned through either the Naval Academy or the NROTC program. Table 3 is a further breakdown of the variables looking at each commissioning program.

B. PROCEDURE

1. Data Elements

The following variables are the elements that make up the data set that was used for analysis:

- SWOS DOC Class Number: the SWOSDOC class number was used to break up the individual classes to track trends in performance over time.

- SWOS DOC Alpha Code: the assigned designator used to identify each SWOSDOC student.

- Sex, Ethnicity, and Commissioning Source: these variables are used to identify the differences in performance by demographic characteristics.

- College attended, major, and GPA: These were recoded to account for type of degree and selectivity.

TABLE 1. SWOS DOC CLASSES IN THE DATA SET

SWOS DOC Class Number	Covening Date	Graduation Date	Class Size
110	7/22/1994	11/24/1994	176
111	9/23/1994	2/3/1995	150
112	11/18/1994	3/31/1995	24
113	2/3/1995	6/2/1995	65
114	6/9/1995	10/6/1995	110
115	7/21/1995	11/17/1995	173
116	9/22/1995	2/2/1996	143
117	11/17/1995	3/29/1996	56
118	2/2/1996	5/31/1996	73
119	6/7/1996	10/4/1996	85
120	7/19/1996	11/15/1996	119
121	9/20/1996	1/31/1997	117
122	11/22/1996	4/3/1997	107
123	1/31/1997	5/30/1997	62
124	5/23/1997	9/19/1997	106
125	7/7/1997	10/31/1997	117
126	9/5/1997	1/16/1998	117
127	11/21/1997	4/3/1998	88
128	1/30/1998	5/29/1998	108
129	5/26/1998	9/18/1998	125
130	7/6/1998	10/30/1998	116
131	9/8/1998	1/15/1999	140
132	11/23/1998	4/2/1999	53
134	5/21/1999	9/17/1999	121
135	7/6/1999	10/29/1999	146
136	9/7/1999	1/14/2000	160
137	11/22/1999	3/31/2000	166

TABLE 2. BREAKDOWN OF VARIABLES IN DATA SET

	FREQUENCY	PERCENT
SEX		
Male	2496	82.6
Female	527	17.4
ETHNICITY		
White	2312	76.5
African American	287	9.5
Other	424	14.0
COMMISSIONING SOURCE		
USNA	1230	40.7
NROTC	1350	44.6
OCS	443	14.7
UNDERGRADUATE MAJOR		
Technical	1577	52.2
Non-Technical	1446	47.8
UNDERGRADUATE INSTITUTION SELECTIVITY		
Most Competitive	1651	54.6
Highly Competitive	375	12.4
Very Competitive	336	11.1
Competitive	467	15.4
Less/Non Competitive	194	6.4
TOTAL	3023	100.0

TABLE 3. BREAKDOWN OF VARIABLES BY ACCESSION SOURCE

	USNA		ROTC		OCS	
	N	%	N	%	N	%
GENDER						
Male	970	78.9%	1128	83.6%	398	89.8%
Female	260	21.1%	222	16.4%	45	10.2%
ETHNICITY						
White	989	80.4%	1022	75.7%	301	67.9%
Black	93	7.6%	132	9.8%	62	14.0%
Other	148	12.0%	196	14.5%	80	18.1%
SELECTIVITY						
Less/Non Competitive			114	8.4%	80	18%
Competitive			285	21.1%	182	41.1%
Very Competitive			230	17.0%	106	23.9%
Highly Competitive			321	23.8%	54	12.2%
Most Competitive	1230	100%	400	29.6%	21	4.7%
UNDERGRADUATE MAJOR						
Technical	731	59.4%	690	51.1%	156	35.2%
Non-Technical	499	40.6%	660	48.9%	287	64.8%
UNDERGRADUATE GPA						
Overall 2.9	2.78		3.13		3.10	

- Follow-on assignment: each student's first ship or station was included but was not examined as this did not impact their performance at SWOSDOC.

- SWOS DOC unit exam scores: this is the grade earned on the first attempt at each unit exam. On a 4.0 scale, a 3.2 is considered a passing grade. The topics of each unit are outlined in Table 4.

TABLE 4. SWOSDOC UNITS

MODULE	TOPIC
UNIT 1	RULES OF THE ROAD
UNIT 2/3	UNDERWAY/INPORT WATCH ORGANIZATION
UNIT 4	THE DIVISION OFFICER/COUNSELING
UNIT 5	NAVIGATION & SEAMANSHIP
UNIT 6	OPERATIONAL ADMINISTRATION
UNIT 7A	COMBAT SYSTEMS EQUIPMENT
UNIT 7B	COMBAT SYSTEMS DOCTRINE
UNIT 8	MARITIME WARFARE: STRATEGY & TACTICS
UNIT 9/10	3-M/SUPPLY MDS
UNIT 11	DAMAGE CONTROL/FIRST AID

- SWOS DOC GPA(CPI AVG): this is the cumulative average of the ten unit exams for each student.

2. Approach

The purpose of this study is to review the performance of the different commissioning sources on the unit exams at SWOS. This is accomplished by analyzing the mean score on each unit exam and the overall course mean score. To determine which units were the most difficult, paired comparison tests were used to determine if there was a significant difference between each commissioning source for the averages for the unit exams with the overall average.

Hierarchical linear regressions are used to assess the impact of variables on performance and to determine significance of these variables. For the purpose of this study, three separate models will be used. Model 1 will use demographics only. Model 2 will add undergraduate education. Model three will contain demographics, undergraduate education, and commissioning program. In running all three models and comparing the results, a determination can be made as to which factors are

significant and if it is a singular variable or a combination that contributes to performance.

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IV. RESULTS & DISCUSSION

This chapter looks for significant differences in the academic performance of SWOSDOC students based on the module, gender, ethnicity, accession source and DOC class.

A. ACADEMIC MODULES UNIVARIATE ANALYSIS

The analysis of academic performance of all students resulted in the conclusion that based on average unit exam scores the unit on Seamanship and Navigation was the most difficult, followed by the units on Maritime Warfare: Strategy and Tactics, Combat Systems Doctrine and Combat Systems Equipment. These units also had the greatest standard deviation on their exams, indicating a wider range of grades scored.

On the reverse end of the spectrum, the unit on the Rules of the Road had the highest average, trailed by 3-M/Supply MDS, The Division Officer/Counseling, and Operational Administration. It is notable that the normal passing grade for a Rules of the Road exam is 90 percent, so students had to score at least a 3.6 to pass the Unit 1 exam. The other unit exams noted above rely mostly upon fairly straightforward information that comes directly out of Navy Regulations and instructions and is not as theoretical as the units that were found to be more difficult.

TABLE 5. MEAN GPA FOR SWOSDOC UNIT EXAMS

MODULE	TOPIC	MEAN GPA	S.D.
Unit 1	Rules of the Road	3.7400	0.1900
Unit 2/3	Underway/Inport Watch Organization	3.5223	0.2467
Unit 4	The Division Officer/Counseling	3.6197	0.2056
Unit 5	Navigation & Seamanship	3.3587	0.3546
Unit 6	Operational Administration	3.5953	0.2349
Unit 7A	Combat Systems Equipment	3.4864	0.3310
Unit 7B	Combat Systems Doctrine	3.4624	0.3289
Unit 8	Maritime Warfare: Strategy & Tactics	3.4347	0.3130
Unit 9/10	3-M/Supply MDS	3.6210	0.2594
Unit 11	Damage Control/First Aid	3.5249	0.2693
	OVERALL	3.5368	0.1580

B. GENDER UNIVARIATE ANALYSIS

Comparison of academic performance by gender does not show any significant disparity. The mean for each sex is separated by less than one hundredths of a grade point, with the males just edging the females. The overall standard deviation is almost identical. The unit exams break out similarly, with the men and the women splitting the honors by having the highest average on five exams each. From the t-test and subsequent regression results, significant gender differences are noted for five units with women showing higher mean scores in units 2/3, 4 and 6. Men had higher mean scores in units 7B and 8. Overall it appears that the men perform better in the direct, hands on areas like Tactics while the women excel in the areas of

Administration and Counseling. Table 6 shows how evenly balanced the sexes were in their SWOSDOC academic performance.

The main issue here is the disparity in numbers between the two groups, 85% male to 15% female. The large number of male students tends to force their average closer to the overall mean. For the female students the opposite is true. Any area of poor performance is more apparent because the low number of women in the sample does not have as strong an effect on the overall mean.

TABLE 6. MEAN GPA FOR SWOSDOC UNIT EXAMS BY GENDER

EXAM	MALE	FEMALE	T-VALUE
UNIT 1	3.7418	3.7316	458.235
UNIT 2/3	3.5179	3.5436	414.285*
UNIT 4	3.6141	3.6461	450.177**
UNIT 5	3.3623	3.3414	333.423
UNIT 6	3.5849	3.6447	440.958***
UNIT 7A	3.4818	3.5079	367.118
UNIT 7B	3.4785	3.3865	342.472***
UNIT 8	3.4525	3.3505	344.142***
UNIT9/10	3.6186	3.6325	415.966
UNIT 11	3.5257	3.5210	394.642
AVERAGES	3.5380	3.5313	447.271
ST. DEV.	.1580	.1579	

* = p<.05
** = p<.01
*** = p<.001

C. ETHNICITY UNIVARIATE ANALYSIS

As shown in Table 7, there are significant differences in academic performance based on race. Although again the numbers may be affected by the preponderant majority of students being Caucasian (see Table 2), it is difficult to explain why white students average above the mean on each and every exam while minority students only did so on one exam. The discrepancies are so great that Blacks did not average higher than the mean on any test and other minorities only did so for Unit 5, where their performance was not statistically different from that of whites. (Appendix A provides the results of post hoc tests of mean paired comparisons of racial/ethnic groups.)

TABLE 7. MEAN GPA FOR SWOSDOC UNIT EXAMS BY ETHNICITY

EXAM	WHITE	BLACK	OTHER	F
UNIT 1	3.7590	3.6429	3.7026	59.433***
UNIT 2/3	3.5488	3.3763	3.4768	74.253***
UNIT 4	3.6367	3.5412	3.5797	37.715***
UNIT 5	3.3648	3.2822	3.3770	7.626**
UNIT 6	3.6149	3.4730	3.5714	50.761***
UNIT 7A	3.5054	3.3758	3.4574	21.753***
UNIT 7B	3.4944	3.3056	3.3940	54.623***
UNIT 8	3.4695	3.2380	3.3781	82.053***
UNIT 9/10	3.6404	3.4838	3.6083	48.386***
UNIT 11	3.5417	3.4322	3.4961	24.257***
AVERAGES	3.5578	3.4151	3.5044	123.889***
ST. DEV.	0.1490	.1597	.1620	

* = p<.05
** = p<.01
*** = p<.001

When looked at in the big picture, the difference between the average of 3.56 for white students and 3.42 for black students amounts to almost four points out of one hundred. But when compared to the variances between genders, accession sources, and even DOC classes, it is a significant break from the overall mean established by the bulk of the DOC students. Simply put, black minority students learned four percent less at SWOSDOC then their white counterparts. They performed particularly poorly in the units of Combat Systems Doctrine and Strategy and Tactics. Other minorities performed poorly as well, but not to the extent of their Black peers.

D. COMMISSIONING SOURCE UNIVARIATE ANALYSIS

The object of this thesis is to look at the different Officer Accession Programs to identify areas of weakness for newly commissioned officers. The results are surprisingly close between the three main accession sources – USNA, NROTC, and OCS. The difference between the overall means for them is just over five hundredths of a grade point. This demonstrates a more level playing field then was originally considered possible. Overall, NROTC had the highest overall average, scoring just one one-hundredth of a point higher the USNA. However, USNA graduates did have a smaller standard deviation on their overall mean, indicating a more consistent level of training. OCS graduates averaged below the mean on each of the ten unit exams, although this was mostly by no more then a few hundredths of a grade point.

Looking at the separate unit exams, USNA graduates had the highest average for Rules of the Road, Navigation, Combat Systems Doctrine and Strategy and Tactics. NROTC had higher

scores on all of the other units. This finding would support the anecdotal perception that USNA graduates historically did not put forth significant effort as SWOSDOC, choosing to decompress instead of studying. The fact that they scored higher on those four specific exams indicates that most USNA graduates relied upon their undergraduate exposure to the information they were exposed to at SWOSDOC, vice putting in time to learn it in Newport. Table 8 presents the results of the univariate comparisons based on accession source. Post hoc comparisons are presented in Appendix B.

TABLE 8. MEAN GPA FOR SWOSDOC UNIT EXAMS BY ACCESSION SOURCE

EXAM	USNA	NROTC	OCS	F
UNIT 1	3.7481	3.7440	3.7055	8.757***
UNIT 2/3	3.5328	3.5387	3.4435	27.165***
UNIT 4	3.6136	3.6300	3.6050	3.388*
UNIT 5	3.3703	3.3597	3.3232	2.895
UNIT 6	3.5876	3.6078	3.5789	3.665*
UNIT 7A	3.4727	3.5117	3.4471	8.140***
UNIT 7B	3.4833	3.4754	3.3649	23.317***
UNIT 8	3.4555	3.4288	3.3951	6.527**
UNIT9/10	3.6151	3.6340	3.5979	3.757*
UNIT 11	3.5030	3.5485	3.5139	9.695***
AVERAGES	3.5382	3.5484	3.4975	17.574***
ST. DEV.	.1481	.1587	.1754	

* = p<.05
** = p<.01
*** = p<.001

E. UNDERGRADUATE EDUCATION UNIVARIATE ANALYSIS

In assessing the impact of undergraduate education on SWOSDOC performance, undergraduate major and the admissions selectivity of a student's undergraduate institution were reviewed. Perhaps the most even break in this data set is between technical and non-technical majors, where it was almost 50/50. Table 8 illustrates the differences between the two. Surprisingly, students with technical undergraduate majors outperformed their peers in every facet of SWOSDOC, scoring above the average on each unit exam. This is interesting as the Navy has continually stressed that its officer corps should have a strong technical background. At SWOSDOC that appears to be to a students advantage. However, the mean difference is never more then five to six hundredths, but it is enough to keep the overall average above the mean for technical majors and below the mean for non-technical majors.

A student's undergraduate institutions admissions selectivity also appears to play a role in their performance at SWOSDOC. Students who attended institutions that were the most competitive and highly competitive in their admissions selection performed above average while students who went to very competitive, competitive, and less/non-competitive schools were below average. Students from the most competitive schools scored above the mean on 9 of 10 unit exams and those from highly competitive did so on 8 of 10. The most competitive schools did so even with the inclusion of the Naval Academy in their numbers.

TABLE 9. MEAN GPA FOR SWOSDOC UNIT EXAMS BY UNDERGRADUATE MAJOR

EXAM	TECHNICAL	NON-TECHNICAL	T-VALUE
UNIT 1	3.7588	3.7195	-324.542***
UNIT 2/3	3.5484	3.4939	-287.999***
UNIT 4	3.6244	3.6145	-317.030
UNIT 5	3.3885	3.3262	-248.410***
UNIT 6	3.6135	3.5754	-301.159***
UNIT 7A	3.5119	3.4585	-266.241***
UNIT 7B	3.4984	3.4232	-260.925***
UNIT 8	3.4552	3.4123	-267.584***
UNIT9/10	3.6480	3.5915	-294.014***
UNIT 11	3.5459	3.5020	-285.547***
AVERAGES	3.5594	3.5121	-307.940***
ST. DEV.	.1502	.1625	

* = p<.0
** = p<.01
*** = p<.001

In looking at the performance of students from competitive and less/non-competitive institutions, it is important to remember that almost 60% of OCS accessions and 30% of NROTC accessions come from these institutions. That these students scored below average on 19 of 20 units between them and were both below average overall raises the question of if there is more then one factor that can contribute to below average performance by a newly commissioned officer. Post hoc comparisons are presented in Appendix C.

TABLE 10. MEAN GPA FOR SWOSDOC UNIT EXAMS BY UNDERGRADUATE UNIVERSITY SELECTIVITY

EXAM	MOST	HIGH	VERY	COMP	LESS/NON	F
UNIT 1	3.7596	3.7292	3.7309	3.7121	3.6774	12.860***
UNIT 2/3	3.5470	3.5276	3.5121	3.4735	3.4378	14.848***
UNIT 4	3.6277	3.6202	3.6151	3.6003	3.6051	1.955
UNIT 5	3.3757	3.3542	3.3435	3.3266	3.3259	2.496*
UNIT 6	3.6047	3.6221	3.5961	3.5645	3.5365	6.986***
UNIT 7A	3.4957	3.5026	3.5031	3.4458	3.4444	3.307*
UNIT 7B	3.4913	3.4887	3.4024	3.4126	3.3902	11.751***
UNIT 8	3.4607	3.4506	3.4292	3.3694	3.3496	11.942***
UNIT9/10	3.6296	3.6580	3.6215	3.5823	3.5690	6.925***
UNIT 11	3.5203	3.5627	3.5258	3.5096	3.5264	2.355
AVERAGES	3.5514	3.5513	3.5290	3.4998	3.4870	16.030***
ST. DEV.	.1503	.1551	.1671	.1640	.1803	

* = p<.05
** = p<.01
*** = p<.001

F. HIERARCHICAL REGRESSION ANALYSIS

The results from the three models used to complete the hierarchical regression support the findings from the univariate analyses and indicate that it would be possible to predict learning difficulties for new SWO accessions. Undergraduate major, university and ethnicity along with accession source all demonstrate a significant role in SWOSDOC performance. Particularly germane to the goal of this thesis is the finding that commissioning sources contributes incremental validity beyond the contribution of demographics and academic characteristics.

TABLE 11. HIERARCHICAL LINEAR REGRESSION RESULTS PREDICTING SWOSDOC UNIT 1 PERFORMANCE FROM DEMOGRAPHICS, UNDERGRADUATE EDUCATION, AND COMMISSIONING PROGRAM

Dependent Variable: Unit 1						
Model	Independent Variables	Beta	Sig.	F	ΔR^2	R^2
1	Sex	-.017	.335	---	---	---
	Minority Black	-.179	.000	---	---	---
	Minority Other	-.103	.000	---	---	---
	Demographics(Comp)			39.931*	---	.038
2	Non-Technical Major	-.088	.000	---	---	---
	Highly Competitive	-.052	.005	---	---	---
	Very Competitive	-.040	.030	---	---	---
	Competitive	-.063	.001	---	---	---
	Less/Non-Competitive	-.065	.001	---	---	---
	Undergraduate Education(Comp)			21.912*	.017	.055
3	NROTC	.123	.000	---	---	---
	OCS	.068	.013	---	---	---
	Accession Source(Comp)			19.696*	.006	.061

* = P<.001

TABLE 12. HIERARCHICAL LINEAR REGRESSION RESULTS PREDICTING SWOSDOC UNIT 2/3 PERFORMANCE FROM DEMOGRAPHICS, UNDERGRADUATE EDUCATION, AND COMMISSIONING PROGRAM

Dependent Variable: Unit 2/3						
Model	Independent Variables	Beta	Sig.	F	ΔR^2	R^2
1	Sex	.044	.014	---	---	---
	Minority Black	-.206	.000	---	---	---
	Minority Other	-.101	.000	---	---	---
	Demographics(Comp)			51.598*	---	.049
2	Non-Technical Major	-.094	.000	---	---	---
	Highly Competitive	-.021	.248	---	---	---
	Very Competitive	-.032	.078	---	---	---
	Competitive	-.074	.000	---	---	---
	Less/Non-Competitive	-.058	.002	---	---	---
	Undergraduate Education(Comp)			26.664*	.017	.066
3	NROTC	.120	.000	---	---	---
	OCS	.002	.928	---	---	---
	Accession Source(Comp)			25.109*	.011	.077

* = P<.001

TABLE 13. HIERARCHICAL LINEAR REGRESSION RESULTS PREDICTING SWOSDOC UNIT 4 PERFORMANCE FROM DEMOGRAPHICS, UNDERGRADUATE EDUCATION, AND COMMISSIONING PROGRAM

Dependent Variable: Unit 4						
Model	Independent Variables	Beta	Sig.	F	ΔR^2	R^2
1	Sex	.061	.001	---	---	---
	Minority Black	-.138	.000	---	---	---
	Minority Other	-.096	.000	---	---	---
	Demographics(Comp)			29.112*	---	.028
2	Non-Technical Major	-.018	.334	---	---	---
	Highly Competitive	-.006	.748	---	---	---
	Very Competitive	-.010	.586	---	---	---
	Competitive	-.026	.171	---	---	---
	Less/Non-Competitive	.011	.560	---	---	---
	Undergraduate Education(Comp)			11.405*	.001	.029
3	NROTC	.132	.000	---	---	---
	OCS	.087	.002	---	---	---
	Accession Source(Comp)			11.436*	.008	.037

* = P<.001

TABLE 14. HIERARCHICAL LINEAR REGRESSION RESULTS PREDICTING SWOSDOC UNIT 5 PERFORMANCE FROM DEMOGRAPHICS, UNDERGRADUATE EDUCATION, AND COMMISSIONING PROGRAM

Dependent Variable: Unit 5						
Model	Independent Variables	Beta	Sig.	F	ΔR^2	R^2
1	Sex	-.020	.261	---	---	---
	Minority Black	-.068	.000	---	---	---
	Minority Other	.012	.522	---	---	---
	Demographics(Comp)			5.506*	---	.005
2	Non-Technical Major	-.079	.000	---	---	---
	Highly Competitive	-.021	.254	---	---	---
	Very Competitive	-.026	.173	---	---	---
	Competitive	-.037	.053	---	---	---
	Less/Non-Competitive	-.020	.302	---	---	---
	Undergraduate Education(Comp)			5.406*	.007	.012
3	NROTC	.035	.210	---	---	---
	OCS	.011	.696	---	---	---
	Accession Source(Comp)			4.522*	.003	.015

* = P<.001

TABLE 15. HIERARCHICAL LINEAR REGRESSION RESULTS PREDICTING SWOSDOC UNIT 6 PERFORMANCE FROM DEMOGRAPHICS, UNDERGRADUATE EDUCATION, AND COMMISSIONING PROGRAM

Dependent Variable: Unit 6						
Model	Independent Variables	Beta	Sig.	F	ΔR^2	R^2
1	Sex	.101	.000	---	---	---
	Minority Black	-.080	.000	---	---	---
	Minority Other	-.063	.000	---	---	---
	Demographics(Comp)			44.800*	---	.043
2	Non-Technical Major	-.071	.000	---	---	---
	Highly Competitive	.033	.075	---	---	---
	Very Competitive	.002	.893	---	---	---
	Competitive	-.029	.120	---	---	---
	Less/Non-Competitive	-.023	.225	---	---	---
	Undergraduate Education(Comp)			20.183*	.008	.051
3	NROTC	.143	.000	---	---	---
	OCS	.117	.000	---	---	---
	Accession Source(Comp)			19.094*	.009	.060

* = P<.001

TABLE 16. HIERARCHICAL LINEAR REGRESSION RESULTS PREDICTING SWOSDOC UNIT 7A PERFORMANCE FROM DEMOGRAPHICS, UNDERGRADUATE EDUCATION, AND COMMISSIONING PROGRAM

Dependent Variable: Unit 7A						
Model	Independent Variables	Beta	Sig.	F	ΔR^2	R^2
1	Sex	.032	.075	---	---	---
	Minority Black	-.116	.000	---	---	---
	Minority Other	-.050	.006	---	---	---
	Demographics(Comp)			15.573*	---	.015
2	Non-Technical Major	-.073	.000	---	---	---
	Highly Competitive	.010	.582	---	---	---
	Very Competitive	.016	.403	---	---	---
	Competitive	-.032	.092	---	---	---
	Less/Non-Competitive	-.007	.714	---	---	---
	Undergraduate Education(Comp)			8.724*	.008	.023
3	NROTC	.142	.000	---	---	---
	OCS	.072	.009	---	---	---
	Accession Source(Comp)			9.774*	.008	.031

* = P<.001

TABLE 17. HIERARCHICAL LINEAR REGRESSION RESULTS PREDICTING SWOSDOC UNIT 7B PERFORMANCE FROM DEMOGRAPHICS, UNDERGRADUATE EDUCATION, AND COMMISSIONING PROGRAM

Dependent Variable: Unit 7B						
Model	Independent Variables	Beta	Sig.	F	ΔR^2	R^2
1	Sex	-.103	.000	---	---	---
	Minority Black	-.166	.000	---	---	---
	Minority Other	-.107	.000	---	---	---
	Demographics(Comp)			48.038*	---	.046
2	Non-Technical Major	-.096	.000	---	---	---
	Highly Competitive	-.008	.671	---	---	---
	Very Competitive	-.083	.000	---	---	---
	Competitive	-.064	.001	--	---	---
	Less/Non-Competitive	-.041	.028	---	---	---
	Undergraduate Education(Comp)			26.565*	.020	.066
3	NROTC	.056	.041	---	---	---
	OCS	-.043	.115	---	---	---
	Accession Source(Comp)			23.445*	.006	.072

* = P<.001

TABLE 18. HIERARCHICAL LINEAR REGRESSION RESULTS PREDICTING SWOSDOC UNIT 8 PERFORMANCE FROM DEMOGRAPHICS, UNDERGRADUATE EDUCATION, AND COMMISSIONING PROGRAM

Dependent Variable: Unit 8						
Model	Independent Variables	Beta	Sig.	F	ΔR^2	R^2
1	Sex	-.120	.000	---	---	---
	Minority Black	-.214	.000	---	---	---
	Minority Other	-.103	.000	---	---	---
	Demographics(Comp)			70.899*	---	.066
2	Non-Technical Major	-.047	.008	---	---	---
	Highly Competitive	-.017	.355	---	---	---
	Very Competitive	-.033	.073	---	---	---
	Competitive	-.084	.000	---	---	---
	Less/Non-Competitive	-.046	.012	---	---	---
	Undergraduate Education(Comp)			31.204*	.010	.076
3	NROTC	.025	.354	---	---	---
	OCS	.018	.506	---	---	---
	Accession Source(Comp)			25.040*	.001	.077

* = P<.001

TABLE 19. HIERARCHICAL LINEAR REGRESSION RESULTS PREDICTING SWOSDOC UNIT 9/10 FROM DEMOGRAPHICS, UNDERGRADUATE EDUCATION, AND COMMISSIONING PROGRAM

Dependent Variable: Unit 9/10						
Model	Independent Variables	Beta	Sig.	F	ΔR^2	R^2
1	Sex	.024	.174	---	---	---
	Minority Black	-.177	.000	---	---	---
	Minority Other	-.043	.078	---	---	---
	Demographics(Comp)			32.883*	---	.032
2	Non-Technical Major	-.096	.000	---	---	---
	Highly Competitive	.039	.035	---	---	---
	Very Competitive	.000	.999	---	---	---
	Competitive	-.035	.060	---	---	---
	Less/Non-Competitive	-.013	.482	---	---	---
	Undergraduate Education(Comp)			17.748*	.013	.045
3	NROTC	.111	.000	---	---	---
	OCS	.081	.003	---	---	---
	Accession Source(Comp)			15.895*	.005	.050

* = P<.001

TABLE 20. HIERARCHICAL LINEAR REGRESSION RESULTS PREDICTING SWOSDOC UNIT 11 PERFORMANCE FROM DEMOGRAPHICS, UNDERGRADUATE EDUCATION, AND COMMISSIONING PROGRAM

Dependent Variable: Unit 11						
Model	Independent Variables	Beta	Sig.	F	ΔR^2	R^2
1	Sex	-.004	.807	---	---	---
	Minority Black	-.119	.000	---	---	---
	Minority Other	-.059	.001	---	---	---
	Demographics(Comp)			16.186*	---	.016
2	Non-Technical Major	-.077	.000	---	---	---
	Highly Competitive	.054	.004	---	---	---
	Very Competitive	.014	.463	---	---	---
	Competitive	.009	.649	---	---	---
	Less/Non-Competitive	.039	.042	---	---	---
	Undergraduate Education(Comp)			9.755*	.009	.025
3	NROTC	.130	.000	---	---	---
	OCS	.079	.004	---	---	---
	Accession Source(Comp)			10.069*	.007	.032

* = P<.001

TABLE 21. HIERARCHICAL LINEAR REGRESSION RESULTS PREDICTING SWOSDOC OVERALL PERFORMANCE FROM DEMOGRAPHICS, UNDERGRADUATE EDUCATION, AND COMMISSIONING PROGRAM

Dependent Variable: Overall Average						
Model	Independent Variables	Beta	Sig.	F	ΔR^2	R^2
1	Sex	-.011	.543	---	---	---
	Minority Black	-.265	.000	---	---	---
	Minority Other	-.118	.000	---	---	---
	Demographics(Comp)			82.699*	---	.076
2	Non-Technical Major	-.129	.000	---	---	---
	Highly Competitive	.002	.926	---	---	---
	Very Competitive	-.033	.067	---	---	---
	Competitive	-.076	.000	---	---	---
	Less/Non-Competitive	-.037	.044	---	---	---
	Undergraduate Education(Comp)			42.441*	.025	.101
3	NROTC	.168	.000	---	---	---
	OCS	.076	.004	---	---	---
	Accession Source(Comp)			38.802*	.013	.114

* = P<.001

G. SWOSDOC CLASS

One other variable in the data was the different DOC classes in which students were grouped. It is worth reviewing student performance using this variable to validate findings from other methods and to determine if there may be any other influence on student performance. In examining proficiency by SWOSDOC class it is interesting to note that no class completed the course of study without scoring below the overall mean for at least one of the unit exams. The majority of classes, 15 of 27, had between 4 and 6 units where they were below the mean GPA for the exam. This indicates that on the whole, performance did not vary significantly from class to class.

Class 117 and Class 119 came closest to perfection with one unit apiece below average. Class 117 performed just below average on the Unit 6 exam and Class 119 fell short on Unit 1. One thing that these two classes had in

common was that there was a majority of NROTC students in them, particularly class 119 where 75 of 85 students were NROTC graduates.

Only one class scored below average on all ten exams and that was Class 137. Upon further examination of Class 137 it is pertinent to note that an unusually high number of OCS graduates were included in the class. 77 of 166 students were commissioned through OCS, which is significant considering only 15% of all students came from OCS. However, Class 136 scored below average on nine of ten exams. A review of the make-up of that class shows only two OCS graduates, with the majority, over 60%, coming from the Naval Academy. These two classes lower performance was more likely caused by faculty preparation for the revised curriculum and testing that was implemented at the beginning of 2000 with Class 138, immediately following Class 136 and in the middle of instruction for Class 137.

Another point of interest about the results of the SWOSDOC classes is that often there were strings of several classes in a row where students scored poorly on the same exams. For example, from Class 113 to Class 118 students performed well below average on the Unit 6 exam. Operational Administration was one of the units that were considered easier when compared with the mean for all exams. Similar strings of at least four classes in a row scoring below average occur for every unit with the exception of Unit 8, which had two strings of three classes. Because each class comprises different students, these strings are more likely the result of the instructors or the unit coordinator.

TABLE 22. MEAN GPA FOR SWOSDOC UNIT EXAMS BY CLASS

DOC Class	UNIT 1	UNIT 2/3	UNIT 4	UNIT 5	UNIT 6	UNIT 7A	UNIT 7B	UNIT 8	UNIT 9/10	UNIT 11	CPI AVG
110	3.78	3.57	3.70	3.41	3.59	3.29	3.61	3.62	3.69	3.59	3.59
111	3.75	3.40	3.63	3.37	3.60	3.52	3.38	3.58	3.65	3.45	3.53
112	3.81	3.63	3.62	3.48	3.68	3.35	3.50	3.56	3.78	3.53	3.59
113	3.84	3.67	3.60	3.50	3.55	3.41	3.56	3.53	3.69	3.44	3.58
114	3.75	3.45	3.67	3.49	3.57	3.42	3.46	3.49	3.66	3.61	3.56
115	3.81	3.47	3.56	3.45	3.39	3.36	3.33	3.50	3.68	3.68	3.52
116	3.77	3.64	3.82	3.39	3.55	3.62	3.57	3.32	3.74	3.76	3.62
117	3.78	3.64	3.65	3.37	3.59	3.60	3.57	3.74	3.79	3.71	3.64
118	3.79	3.45	3.64	3.39	3.57	3.51	3.56	3.42	3.72	3.64	3.57
119	3.73	3.57	3.63	3.47	3.65	3.56	3.53	3.48	3.63	3.77	3.62
120	3.74	3.42	3.57	3.31	3.62	3.67	3.49	3.42	3.71	3.36	3.53
121	3.82	3.43	3.68	3.21	3.59	3.41	3.55	3.30	3.54	3.50	3.50
122	3.80	3.49	3.54	3.28	3.59	3.68	3.19	3.46	3.60	3.52	3.51
123	3.81	3.32	3.59	3.13	3.68	3.40	3.71	3.59	3.55	3.69	3.55
124	3.73	3.55	3.39	3.23	3.62	3.65	3.41	3.40	3.62	3.38	3.50
125	3.71	3.50	3.54	3.37	3.64	3.54	3.66	3.35	3.52	3.51	3.54
126	3.76	3.61	3.67	3.42	3.67	3.65	3.62	3.44	3.66	3.58	3.61
127	3.73	3.54	3.60	3.38	3.70	3.61	3.64	3.57	3.69	3.70	3.62
128	3.74	3.48	3.53	3.51	3.66	3.61	3.38	3.46	3.67	3.70	3.58
129	3.74	3.46	3.70	3.44	3.56	3.49	3.44	3.46	3.65	3.52	3.55
130	3.75	3.61	3.65	3.52	3.63	3.60	3.34	3.31	3.73	3.56	3.57
131	3.65	3.64	3.59	3.51	3.67	3.59	3.37	3.44	3.50	3.48	3.54
132	3.71	3.54	3.73	3.36	3.74	3.69	3.47	3.37	3.41	3.52	3.55
134	3.65	3.70	3.74	3.29	3.55	3.35	3.54	3.47	3.58	3.46	3.53
135	3.72	3.73	3.69	3.28	3.66	3.39	3.50	3.35	3.62	3.42	3.53
136	3.64	3.51	3.58	3.11	3.63	3.43	3.41	3.31	3.42	3.38	3.46
137	3.67	3.30	3.56	3.23	3.58	3.20	3.19	3.28	3.62	3.28	3.39
Tota1	3.74	3.53	3.63	3.36	3.61	3.50	3.47	3.44	3.63	3.54	3.55

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V. RECOMMENDATIONS AND CONCLUSIONS

The objective of this thesis was to review historical data from the Division Officer Course to identify areas of weakness for newly commissioned officers from various commissioning sources. The recent sea change in the training of new commissioned entering the Surface Warfare community has the potential to affect everything from the level of knowledge that our junior officers attain or the speed at which they qualify as Surface Warfare Officers to long-term issues such as retention or promotion. The need is to start all officers at the same point so that everyone has an equal opportunity to succeed and learn.

A. CONCLUSIONS

The primary focus of this study was on officer accession sources and the areas at SWOSDOC where officers from each of accession source experienced the most difficulty. As covered in Chapter II, the Professional Core Competencies (PCC) Manual for Officer Accession Programs is in place to standardize the required training conducted at the different officer accession programs. Looking at the results from Chapter IV, the PCC appears to have been fairly successful in that the difference among the three main accession programs, USNA, NROTC, and OCS, are separated by mere hundredths of a grade point. OCS graduates did perform significantly poorer in the Rules of the Road, Underway Watch Organization, Combat Systems Equipment, Combat Systems Doctrine, Strategy and Tactics, and Damage Control. USNA and NROTC graduates would have

had a great deal more exposure in these subjects prior to commissioning from their summer training and in the classroom.

As could be expected from a 13 week course, OCS graduates did score below average on every unit - but not to a great extent. What is unexpected is that Naval Academy graduates averaged below the mean(and lower then NROTC) on half of the exams, although, as stated before, this could be explained if the common perception that USNA grads put minimal effort into SWOSDOC is true. This is not to say that graduates from the Academy are lazy; but they may be recovering from a competitive and academically stressful four-year program at a highly competitive university.

Using the hierarchical regressions it was evident that there are multiple variables that can be used to predict if a new Surface Warfare Officer will struggle. While there is no perfect way of pre-determining if an individual will be successful, extra mentoring may be helpful for racial minorities, OCS graduates, and officers with non-technical degrees.

B. RECOMMENDATIONS AND FUTURE RESEARCH

Based on the results of the analysis, there are a few ways that the Navy could proceed to ensure that all newly commissioned officers are ready upon reporting to their first ship. As OCS was shown to be slightly behind the other accession sources, extra resources deserve to be placed there to further train those graduates going on to the Surface Warfare Community. It would be impossible to fit more into the initial 13 weeks of training. However, upon graduation students could be routed to another brief

but more SWO specific training before detaching from Pensacola. This could be as short as a week or as long as a month and, of course, is dependent upon classroom, instructor, and berthing availability.

Another place that students could be better prepared prior to graduation is the professional course that USNA and NROTC midshipmen take during their final semester before commissioning. This is an area where a curriculum could be developed in cooperation with SWOSDOC to use this time to ensure that those areas of weakness, especially those administrative units that Naval Academy graduates fell short in, are covered prior to commissioning.

A future study would be warranted to attempt to determine the reasons behind the lower performance by minorities at SWOSDOC. The fact that Blacks and other minorities all scored lower then Whites needs to be examined, particularly as new data become available from the Division Officer at Sea training program. Further research could also be done to review and assess the recruitment of officers for the OCS and NROTC programs. OCS in particular had much greater percentages of officers who earned non-technical degrees from colleges with lower admissions selectivity.

This study should be replicated with the inclusion of data on recycling. It is possible that “recycles” are higher among some sources. This would confound the commissioning source and other comparisons. The potential “burn out” phenomenon of USNA graduates should be investigated and recycle rates would be a first step in such research.

C. SUMMARY

Overall, the fact that on the whole almost all of the differences between the mean GPA and the GPAs for the commissioning sources were measured in hundredths of points indicates that it should be possible for the Division Officer at Sea training program to be successful. The end results should still be the same and the benefits outweigh the risks in transferring the program from shore to ship. However, evaluation of the new SWOS curriculum warrants future investigation.

APPENDIX A. POST-HOC QUERIES FOR ETHNICITY ONE WAY ANOVA COMPARISONS

TABLE A1. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 1

	(I)Ethnicity	(J)Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	.1161	1.167E-02	.000	8.873E-02	.1434
		Other	5.639E-02	9.850E-03	.000	3.331E-02	7.948E-02
	Black	White	-.1161	1.167E-02	.000	-.1434	-8.8725E-02
		Other	-5.9679E-02	1.425E-02	.000	-9.3080E-02	-2.6278E-02
	Other	White	-5.6394E-02	9.850E-03	.000	-7.9479E-02	-3.3309E-02
		Black	5.968E-02	1.425E-02	.000	2.628E-02	9.308E-02
Scheffe	White	Black	.1161	1.167E-02	.000	8.750E-02	.1446
		Other	5.639E-02	9.850E-03	.000	3.227E-02	8.052E-02
	Black	White	-.1161	1.167E-02	.000	-.1446	-8.7497E-02
		Other	-5.9679E-02	1.425E-02	.000	-9.4580E-02	-2.4778E-02
	Other	White	-5.6394E-02	9.850E-03	.000	-8.0516E-02	-3.2272E-02
		Black	5.968E-02	1.425E-02	.000	2.478E-02	9.458E-02
Bonferroni	White	Black	.1161	1.167E-02	.000	8.812E-02	.1440
		Other	5.639E-02	9.850E-03	.000	3.280E-02	7.999E-02
	Black	White	-.1161	1.167E-02	.000	-.1440	-8.8123E-02
		Other	-5.9679E-02	1.425E-02	.000	-9.3815E-02	-2.5542E-02
	Other	White	-5.6394E-02	9.850E-03	.000	-7.9987E-02	-3.2800E-02
		Black	5.968E-02	1.425E-02	.000	2.554E-02	9.382E-02

* Mean difference is significant at .05 ...

TABLE A2. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNITS 2/3

	(I)Ethnicity	(J)Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	.1725	1.508E-02	.000	.1372	.2079
		Other	7.201E-02	1.273E-02	.000	4.218E-02	.1018
	Black	White	-.1725	1.508E-02	.000	-.2079	-.1372
		Other	-.1005	1.842E-02	.000	-.1437	-5.7346E-02
	Other	White	-7.2009E-02	1.273E-02	.000	-.1018	-4.2177E-02
		Black	.1005	1.842E-02	.000	5.735E-02	.1437
Scheffe	White	Black	.1725	1.508E	.000	.1356	.2094
		Other	7.201E-02	1.273E-02	.000	4.084E-02	.1032
	Black	White	-.1725	1.508E-02	.000	.2094	.1356
		Other	-.1005	1.842E-02	.000	-.1456	-5.5407E-02
	Other	White	-7.2009E-02	1.273E-02	.000	-.1032	-4.0837E-02
		Black	.1005	1.842E-02	.000	5.541E-02	.1456
Bonferroni	White	Black	.1725	1.508E-02	.000	.1364	.2086
		Other	7.201E-02	1.273E-02	.000	4.152E-02	.1025
	Black	White	-.1725	1.508E-02	.000	-.2086	-.1364
		Other	-.1005	1.842E-02	.000	-.1446	-5.6395E-02
	Other	White	-7.2009E-02	1.273E-02	.000	-.1025	-4.1520E-02
		Black	.1005	1.842E-02	.000	5.640E-02	.1446

TABLE A3. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 4

	(I)Ethnicity	(J)Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	9.548E-02	1.272E-02	.000	6.568E-02	.1253
		Other	5.699E-02	1.073E-02	.000	3.183E-02	8.215E-02
	Black	White	-9.5479E-02	1.272E-02	.000	-.1253	-6.5677E-02
		Other	-3.8490E-02	1.553E-02	.035	-7.4889E-02	-2.0906E-03
	Other	White	-5.6989E-02	1.073E-02	.000	-8.2146E-02	-3.1832E-02
		Black	3.849E-02	1.553E-02	.035	2.091E-03	7.489E-02
Scheffe	White	Black	9.548E-02	1.272E-02	.000	6.434E-02	.1266
		Other	5.699E-02	1.073E-02	.000	3.070E-02	8.328E-02
	Black	White	-9.5479E-02	1.272E-02	.000	-.1266	-6.4338E-02
		Other	-3.8490E-02	1.553E-02	.047	-7.6523E-02	-4.5588E-04
	Other	White	-5.6989E-02	1.073E-02	.000	-8.3276E-02	-3.0702E-02
		Black	3.849E-02	1.553E-02	.047	4.559E-04	7.652E-02
Bonferroni	White	Black	9.548E-02	1.272E-02	.000	6.502E-02	.1259
		Other	5.699E-02	1.073E-02	.000	3.128E-02	8.270E-02
	Black	White	-9.5479E-02	1.272E-02	.000	-.1259	-6.5020E-02
		Other	-3.8490E-02	1.553E-02	.040	-7.5690E-02	-1.2890E-03
	Other	White	-5.6989E-02	1.073E-02	.000	-8.2700E-02	-3.1278E-02
		Black	3.849E-02	1.553E-02	.040	1.289E-03	7.569E-02

* Mean difference is significant at .05 ...

TABLE A4. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 5

	(I)Ethnicity	(J)Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	8.263E-02	2.214E-02	.001	3.074E-02	.1345
		Other	-1.2214E-02	1.869E-02	.790	-5.6020E-02	3.159E-02
	Black	White	-8.2631E-02	2.214E-02	.001	-.1345	-3.0737E-02
		Other	-9.4844E-02	2.704E-02	.001	-.1582	-3.1463E-02
	Other	White	1.221E-02	1.869E-02	.790	-3.1592E-02	5.602E-02
		Black	9.484E-02	2.704E-02	.001	3.146E-02	.1582
Scheffe	White	Black	8.263E-02	2.214E-02	.001	2.841E-02	.1369
		Other	-1.2214E-02	1.869E-02	.808	-5.7987E-02	3.356E-02
	Black	White	-8.2631E-02	2.214E-02	.001	-.1369	-2.8406E-02
		Other	-9.4844E-02	2.704E-02	.002	-.1611	-2.8616E-02
	Other	White	1.221E-02	1.869E-02	.808	-3.3560E-02	5.799E-02
		Black	9.484E-02	2.704E-02	.002	2.862E-02	.1611
Bonferroni	White	Black	8.263E-02	2.214E-02	.001	2.959E-02	.1357
		Other	-1.2214E-02	1.869E-02	1.000	-5.6984E-02	3.256E-02
	Black	White	-8.2631E-02	2.214E-02	.001	-.1357	-2.9594E-02
		Other	-9.4844E-02	2.704E-02	.001	-.1596	-3.0067E-02
	Other	White	1.221E-02	1.869E-02	1.000	-3.2557E-02	5.698E-02
		Black	9.484E-02	2.704E-02	.001	3.007E-02	.1596

* Mean difference is significant at .05 ...

TABLE A5. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 6

	(I)Ethnicity	(J)Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	.1419	1.447E-02	.000	.1080	.1758
		Other	4.348E-02	1.221E-02	.001	1.486E-02	7.210E-02
	Black	White	-.1419	1.447E-02	.000	-.1758	-.1080
		Other	-9.8453E-02	1.767E-02	.000	-.1399	-5.7040E-02
	Other	White	-4.3481E-02	1.221E-02	.001	-7.2104E-02	-1.4858E-02
		Black	9.845E-02	1.767E-02	.000	5.704E-02	.1399
Scheffe	White	Black	.1419	1.447E-02	.000	.1065	.1774
		Other	4.348E-02	1.221E-02	.002	1.357E-02	7.339E-02
	Black	White	-.1419	1.447E-02	.000	-.1774	-.1065
		Other	-9.8453E-02	1.767E-02	.000	-.1417	-5.5180E-02
	Other	White	-4.3481E-02	1.221E-02	.002	-7.3389E-02	-1.3573E-02
		Black	9.845E-02	1.767E-02	.000	5.518E-02	.1417
Bonferroni	White	Black	.1419	1.447E-02	.000	.1073	.1766
		Other	4.348E-02	1.221E-02	.001	1.423E-02	7.273E-02
	Black	White	-.1419	1.447E-02	.000	-.1766	-.1073
		Other	-9.8453E-02	1.767E-02	.000	-.1408	-5.6128E-02
	Other	White	-4.3481E-02	1.221E-02	.001	-7.2734E-02	-1.4228E-02
		Black	9.845E-02	1.767E-02	.000	5.613E-02	.1408

* Mean difference is significant at .05 ...

TABLE A6. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 7A

	(I)Ethnicity	(J)Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	.1296	2.058E-02	.000	8.137E-02	.1778
		Other	4.805E-02	1.737E-02	.016	7.342E-03	8.875E-02
	Black	White	-.1296	2.058E-02	.000	-.1778	-8.1365E-02
		Other	-8.1540E-02	2.513E-02	.003	-.1404	-2.2643E-02
	Other	White	-4.8048E-02	1.737E-02	.016	-8.8755E-02	-7.3415E-03
		Black	8.154E-02	2.513E-0	.003	2.264E-02	.1404
Scheffe	White	Black	.1296	2.058E-02	.000	7.920E-02	.1800
		Other	4.805E-02	1.737E-02	.022	5.513E-03	9.058E-02
	Black	White	-.1296	2.058E-02	.000	-.1800	-7.9199E-02
		Other	-8.1540E-02	2.513E-02	.005	-.1431	-1.9997E-02
	Other	White	-4.8048E-02	1.737E-02	.022	-9.0583E-02	-5.5133E-03
		Black	8.154E-02	2.513E-02	.005	2.000E-02	.1431
Bonferroni	White	Black	.1296	2.058E-02	.000	8.030E-02	.1789
		Other	4.805E-02	1.737E-02	.017	6.445E-03	8.965E-02
	Black	White	-.1296	2.058E-02	.000	-.1789	-8.0303E-02
		Other	-8.1540E-02	2.513E-02	.004	-.1417	-2.1345E-02
	Other	White	-4.8048E-02	1.737E-02	.017	-8.9651E-02	-6.4451E-03
		Black	8.154E-02	2.513E-02	.004	2.135E-02	.1417

* Mean difference is significant at .05 ...

TABLE A7. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 7B

	(I)Ethnicity	(J)Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	.1889	2.023E-02	.000	.1415	.2363
		Other	.1004	1.708E-02	.000	6.041E-02	.1405
	Black	White	-.1889	2.023E-02	.000	-.2363	-.1415
		Other	-8.8435E-02	2.471E-02	.001	-.1463	-3.0525E-02
	Other	White	-.1004	1.708E-02	.000	-.1405	-6.0407E-02
		Black	8.843E-02	2.471E-02	.001	3.053E-02	.1463
Scheffe	White	Black	.1889	2.023E-02	.000	.1393	.2384
		Other	.1004	1.708E-02	.000	5.861E-02	.1423
	Black	White	-.1889	2.023E-02	.000	-.2384	-.1393
		Other	-8.8435E-02	2.471E-02	.002	-.1489	-2.7924E-02
	Other	White	-.1004	1.708E-02	.000	-.1423	-5.8609E-02
		Black	8.843E-02	2.471E-02	.002	2.792E-02	.1489
Bonferroni	White	Black	.1889	2.023E-02	.000	.1404	.2373
		Other	.1004	1.708E-02	.000	5.953E-02	.1413
	Black	White	-.1889	2.023E-02	.000	-.2373	-.1404
		Other	-8.8435E-02	2.471E-02	.001	-.1476	-2.9250E-02
	Other	White	-.1004	1.708E-02	.000	-.1413	-5.9525E-02
		Black	8.843E-02	2.471E-02	.001	2.925E-02	.1476

* Mean difference is significant at .05 ...

TABLE A8. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 8

	(I)Ethnicity	(J)Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	.2315	1.908E-02	.000	.1867	.2762
		Other	9.140E-02	1.611E-02	.000	5.365E-02	.1292
	Black	White	-.2315	1.908E-02	.000	-.2762	-.1867
		Other	-.1401	2.331E-02	.000	-.1947	-8.5426E-02
	Other	White	-9.1401E-02	1.611E-02	.000	-.1292	-5.3647E-02
		Black	.1401	2.331E-02	.000	8.543E-02	.1947
Scheffe	White	Black	.2315	1.908E-02	.000	.1847	.2782
		Other	9.140E-02	1.611E-02	.000	5.195E-02	.1309
	Black	White	-.2315	1.908E-02	.000	-.2782	-.1847
		Other	-.1401	2.331E-02	.000	-.1971	-8.2972E-02
	Other	White	-9.1401E-02	1.611E-02	.000	-.1309	-5.1952E-02
		Black	.1401	2.331E-02	.000	8.297E-02	.1971
Bonferroni	White	Black	.2315	1.908E-02	.000	.1857	.2772
		Other	9.140E-02	1.611E-02	.000	5.282E-02	.1300
	Black	White	-.2315	1.908E-02	.000	-.2772	-.1857
		Other	-.1401	2.331E-02	.000	-.1959	-8.4223E-02
	Other	White	-9.1401E-02	1.611E-02	.000	-.1300	-5.2816E-02
		Black	.1401	2.331E-02	.000	8.422E-02	.1959

* Mean difference is significant at .05 ...

TABLE A9. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNITS 9/10

	(I)Ethnicity	(J)Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	.1566	1.602E-02	.000	.1190	.1941
		Other	3.208E-02	1.352E-02	.047	3.854E-04	6.377E-02
	Black	White	-.1566	1.602E-02	.000	-.1941	-.1190
		Other	-.1245	1.956E-02	.000	-.1704	-7.8653E-02
	Other	White	-3.2075E-02	1.352E-02	.047	-6.3765E-02	-3.8544E-04
		Black	.1245	1.956E-02	.000	7.865E-02	.1704
Scheffe	White	Black	.1566	1.602E-02	.000	.1174	.1958
		Other	3.208E-02	1.352E-02	.060	-1.0378E-03	6.519E-02
	Black	White	-.1566	1.602E-02	.000	-.1958	-.1174
		Other	-.1245	1.956E-02	.000	-.1724	-7.6594E-02
	Other	White	-3.2075E-02	1.352E-02	.060	-6.5188E-02	1.038E-03
		Black	.1245	1.956E-02	.000	7.659E-02	.1724
Bonferroni	White	Black	.1566	1.602E-02	.000	.1182	.1949
		Other	3.208E-02	1.352E-02	.053	-3.1245E-04	6.446E-02
	Black	White	-.1566	1.602E-02	.000	-.1949	-.1182
		Other	-.1245	1.956E-02	.000	-.1714	-7.7643E-02
	Other	White	-3.2075E-02	1.352E-02	.053	-6.4463E-02	3.124E-04
		Black	.1245	1.956E-02	.000	7.764E-02	.1714

* Mean difference is significant at .05 ...

TABLE A10.MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 11

	(I)Ethnicity	(J)Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	.1094	1.673E-02	.000	7.024E-02	.1487
		Other	4.554E-02	1.412E-02	.004	1.244E-02	7.863E-02
	Black	White	-.1094	1.673E-02	.000	-.1487	-7.0241E-02
		Other	-6.3912E-02	2.043E-02	.005	-.1118	-1.6026E-02
	Other	White	-4.5537E-02	1.412E-02	.004	-7.8633E-02	-1.2441E-02
		Black	6.391E-02	2.043E-02	.005	1.603E-02	.1118
Scheffe	White	Black	.1094	1.673E-02	.000	6.848E-02	.1504
		Other	4.554E-02	1.412E-02	.006	1.095E-02	8.012E-02
	Black	White	-.1094	1.673E-02	.000	-.1504	-6.8480E-02
		Other	-6.3912E-02	2.043E-02	.008	-.1139	-1.3875E-02
	Other	White	-4.5537E-02	1.412E-02	.006	-8.0119E-02	-1.0954E-02
		Black	6.391E-02	2.043E-02	.008	1.388E-02	.1139
Bonferroni	White	Black	.1094	1.673E-02	.000	6.938E-02	.1495
		Other	4.554E-02	1.412E-02	.004	1.171E-02	7.936E-02
	Black	White	-.1094	1.673E-02	.000	-.1495	-6.9378E-02
		Other	-6.3912E-02	2.043E-02	.005	-.1129	-1.4971E-02
	Other	White	-4.5537E-02	1.412E-02	.004	-7.9362E-02	-1.1712E-02
		Black	6.391E-02	2.043E-02	.005	1.497E-02	.1129

* Mean difference is significant at .05 ...

TABLE A11.MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF OVERALL PERFORMANCE

	(I)Ethnicity	(J)Ethnicity	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	.1427	9.506E-03	.000	.1204	.1650
		Other	5.343E-02	8.025E-03	.000	3.462E-02	7.224E-02
	Black	White	-.1427	9.506E-03	.000	-.1650	-.1204
		Other	-8.9281E-02	1.161E-02	.000	-.1165	-6.2069E-02
	Other	White	-5.3429E-02	8.025E-03	.000	-7.2236E-02	-3.4621E-02
		Black	8.928E-02	1.161E-02	.000	6.207E-02	.1165
Scheffe	White	Black	.1427	9.506E-03	.000	.1194	.1660
		Other	5.343E-02	8.025E-03	.000	3.378E-02	7.308E-02
	Black	White	-.1427	9.506E-03	.000	-.1660	-.1194
		Other	-8.9281E-02	1.161E-02	.000	-.1177	-6.0847E-02
	Other	White	-5.3429E-02	8.025E-03	.000	-7.3081E-02	-3.3777E-02
		Black	8.928E-02	1.161E-02	.000	6.085E-02	.1177
Bonferroni	White	Black	.1427	9.506E-03	.000	.1199	.1655
		Other	5.343E-02	8.025E-03	.000	3.421E-02	7.265E-02
	Black	White	-.1427	9.506E-03	.000	-.1655	-.1199
		Other	-8.9281E-02	1.161E-02	.000	-.1171	-6.1469E-02
	Other	White	-5.3429E-02	8.025E-03	.000	-7.2650E-02	-3.4207E-02
		Black	8.928E-02	1.161E-02	.000	6.147E-02	.1171

* Mean difference is significant at .05 ...

APPENDIX B. POST-HOC QUERIES FOR ACCESSION SOURCE ONE WAY ANOVA COMPARISONS

TABLE B1. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 1

	Accession Source(I)	Accession Source(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	4.157E-03	7.471E-0	.843	-1.3352E-02	2.167E-02
		Other	4.260E-02	1.050E-02	.000	1.799E-02	6.722E-02
	Black	White	-4.1572E-03	7.471E-03	.843	-2.1666E-02	1.335E-02
		Other	3.845E-02	1.038E-02	.001	1.413E-02	6.277E-02
	Other	White	-4.2604E-02	1.050E-02	.000	-6.7218E-02	-1.7991E-02
		Black	-3.8447E-02	1.038E-02	.001	-6.2769E-02	-1.4125E-02
Scheffe	White	Black	4.157E-03	7.471E-03	.857	-1.4138E-02	2.245E-02
		Other	4.260E-02	1.050E-02	.000	1.689E-02	6.832E-02
	Black	White	-4.1572E-03	7.471E-03	.857	-2.2453E-02	1.414E-02
		Other	3.845E-02	1.038E-02	.001	1.303E-02	6.386E-02
	Other	White	-4.2604E-02	1.050E-02	.000	-6.8323E-02	-1.6886E-02
		Black	-3.8447E-02	1.038E-02	.001	-6.3862E-02	-1.3033E-02
Bonferroni	White	Black	4.157E-03	7.471E-03	1.000	-1.3738E-02	2.205E-02
		Other	4.260E-02	1.050E-02	.000	1.745E-02	6.776E-02
	Black	White	-4.1572E-03	7.471E-03	1.000	-2.2052E-02	1.374E-02
		Other	3.845E-02	1.038E-02	.001	1.359E-02	6.330E-02
	Other	White	-4.2604E-02	1.050E-02	.000	-6.7760E-02	-1.7449E-02
		Black	-3.8447E-02	1.038E-02	.001	-6.3305E-02	-1.3590E-02

* Mean difference is significant at .05 …

TABLE B2. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNITS 2/3

	Accession Source(I)	Accession Source(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	-5.9070-03	9.642E-03	.813	-2.8504E-02	1.669E-02
		Other	8.931E-02	1.355E-02	.000	5.755E-02	.1211
	Black	White	5.907E-03	9.642E-03	.813	-1.6690E-02	2.850E-02
		Other	9.522E-02	1.339E-02	.000	6.383E-02	.1266
	Other	White	-8.9311E-02	1.355E-02	.000	-.1211	-5.7546E-02
		Black	-9.5218E-02	1.339E-02	.000	-.1266	-6.3829E-02
Scheffe	White	Black	-5.9070E-03	9.642E-03	.829	-2.9519E-02	1.770E-02
		Other	8.931E-02	1.355E-02	.000	5.612E-02	.1225
	Black	White	5.907E-03	9.642E-03	.829	-1.7705E-02	2.952E-02
		Other	9.522E-02	1.339E-02	.000	6.242E-02	.1280
	Other	White	-8.9311E-02	1.355E-02	.000	-.1225	-5.6119E-02
		Black	-9.5218E-02	1.339E-02	.000	-.1280	-6.2419E-02
Bonferroni	White	Black	-5.9070E-03	9.642E-03	1.000	-2.9002E-02	1.719E-02
		Other	8.931E-02	1.355E-02	.000	5.685E-02	.1218
	Black	White	5.90E-03	9.642E-03	1.000	-1.7188E-02	2.900E-02
		Other	9.522E-02	1.339E-02	.000	6.314E-02	.1273
	Other	White	-8.9311E-02	1.355E-02	.000	-.1218	-5.6847E-02
		Black	-9.5218E-02	1.339E-02	.000	-.1273	-6.3138E-02

TABLE B3. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 4

	Accession Source(I)	Accession Source(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	-1.6444E-02	8.099E-03	.105	-3.5426E-02	2.538E-03
		Other	8.608E-03	1.139E-02	.730	-1.8076E-02	3.529E-02
	Black	White	1.644E-02	8.099E-03	.105	-2.5381E-03	3.543E-02
		Other	2.505E-02	1.125E-02	.067	-1.3160E-03	5.142E-02
	Other	White	-8.6078E-03	1.139E-02	.730	-3.5291E-02	1.808E-02
		Black	-2.5051E-02	1.125E-02	.067	-5.1419E-02	1.316E-03
Scheffe	White	Black	-1.6444E-02	8.099E-03	.127	-3.6278E-02	3.391E-03
		Other	8.608E-03	1.139E-02	.751	-1.9274E-02	3.649E-02
	Black	White	1.644E-02	8.099E-03	.127	-3.3906E-03	3.628E-02
		Other	2.505E-02	1.125E-02	.084	-2.5003E-03	5.260E-02
	Other	White	-8.6078E-03	1.139E-02	.751	-3.6490E-02	1.927E-02
		Black	-2.5051E-02	1.125E-02	.084	-5.2603E-02	2.500E-03
Bonferroni	White	Black	-1.6444E-02	8.099E-03	.127	-3.5844E-02	2.956E-03
		Other	8.608E-03	1.139E-02	1.000	-1.8663E-02	3.588E-02
	Black	White	1.644E-02	8.099E-03	.127	-2.9561E-03	3.584E-02
		Other	2.505E-02	1.125E-02	.078	-1.8967E-03	5.200E-02
	Other	White	-8.6078E-03	1.139E-02	1.000	-3.5879E-02	1.866E-02
		Black	-2.5051E-02	1.125E-02	.078	-5.2000E-02	1.897E-03

* Mean difference is significant at .05 ...

TABLE B4. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 5

	Accession Source(I)	Accession Source(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	1.070E-02	1.397E-02	.724	-2.2040E-02	4.343E-02
		Other	4.716E-02	1.963E-02	.043	1.147E-03	9.318E-02
	Black	White	-1.0695E-02	1.397E-02	.724	-4.3431E-02	2.204E-02
		Other	3.647E-02	1.940E-02	.145	-9.0037E-03	8.194E-02
	Other	White	-4.7164E-02	1.963E-02	.043	-9.3182E-02	-1.1468E-03
		Black	-3.6469E-02	1.940E-02	.145	-8.1942E-02	9.004E-03
Scheffe	White	Black	1.070E-02	1.397E-02	.746	-2.3510E-02	4.490E-02
		Other	4.716E-02	1.963E-02	.056	-9.1993E-04	9.525E-02
	Black	White	-1.0695E-02	1.397E-02	.746	-4.4901E-02	2.351E-02
		Other	3.647E-02	1.940E-02	.171	-1.1046E-02	8.398E-02
	Other	White	-4.7164E-02	1.963E-02	.056	-9.5249E-02	9.199E-04
		Black	-3.6469E-02	1.940E-02	.171	-8.3984E-02	1.105E-02
Bonferroni	White	Black	1.070E-02	1.397E-02	1.000	-2.2761E-02	4.415E-02
		Other	4.716E-02	1.963E-02	.049	1.334E-04	9.420E-02
	Black	White	-1.0695E-02	1.397E-02	1.000	-4.4152E-02	2.276E-02
		Other	3.647E-02	1.940E-02	.181	-1.0005E-02	8.294E-02
	Other	White	-4.7164E-02	1.963E-02	.049	-9.4195E-02	-1.3340E-04
		Black	-3.6469E-02	1.940E-02	.181	-8.2943E-02	1.001E-02

* Mean difference is significant at .05 ...

TABLE B5. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 6

	Accession Source(I)	Accession Source(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	-2.0232E-02	9.253E-03	.073	-4.1917E-02	1.454E-03
		Other	8.690E-03	1.301E-02	.782	-2.1795E-02	3.917E-02
	Black	White	2.023E-02	9.253E-03	.073	-1.4541E-03	4.192E-02
		Other	2.892E-02	1.285E-02	.063	-1.2021E-03	5.904E-02
	Other	White	-8.6896E-03	1.301E-02	.782	-3.9174E-02	2.179E-02
		Black	-2.8921E-02	1.285E-02	.063	-5.9045E-02	1.202E-03
Scheffe	White	Black	-2.0232E-02	9.253E-03	.092	-4.2891E-02	2.428E-03
		Other	8.690E-03	1.301E-02	.800	-2.3164E-02	4.054E-02
	Black	White	2.023E-02	9.253E-03	.092	-2.4280E-03	4.289E-02
		Other	2.892E-02	1.285E-02	.080	-2.5550E-03	6.040E-02
	Other	White	-8.6896E-03	1.301E-02	.800	-4.0543E-02	2.316E-02
		Black	-2.8921E-02	1.285E-02	.080	-6.0398E-02	2.555E-03
Bonferroni	White	Black	-2.0232E-02	9.253E-03	.087	-4.2395E-02	1.932E-03
		Other	8.690E-03	1.301E-02	1.000	-2.2466E-02	3.985E-02
	Black	White	2.023E-02	9.253E-03	.087	-1.9316E-03	4.239E-02
		Other	2.892E-02	1.285E-02	.074	-1.8655E-03	5.971E-02
	Other	White	-8.6896E-03	1.301E-02	1.000	-3.9845E-02	2.247E-02
		Black	-2.8921E-02	1.285E-02	.074	-5.9708E-02	1.866E-03

* Mean difference is significant at .05 …

TABLE B6. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 7A

	Accession Source(I)	Accession Source(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	-3.8935E-02	1.302E-02	.008	-6.9443E-02	-8.4271E-03
		Other	2.562E-02	1.830E-02	.341	-1.7265E-02	6.851E-02
	Black	White	3.893E-02	1.302E-02	.008	8.427E-03	6.944E-02
		Other	6.456E-02	1.808E-02	.001	2.218E-02	.1069
	Other	White	-2.5621E-02	1.830E-02	.341	-6.8507E-02	1.726E-02
		Black	-6.4556E-02	1.808E-02	.001	-.1069	-2.2178E-02
Scheffe	White	Black	-3.8935E-02	1.302E-02	.011	-7.0813E-02	-7.0569E-03
		Other	2.562E-02	1.830E-02	.375	-1.9191E-02	7.043E-02
	Black	White	3.893E-02	1.302E-02	.011	7.057E-03	7.081E-02
		Other	6.456E-02	1.808E-02	.002	2.027E-02	.1088
	Other	White	-2.5621E-02	1.830E-02	.375	-7.0433E-02	1.919E-02
		Black	-6.4556E-02	1.808E-02	.002	-.1088	-2.0274E-02
Bonferroni	White	Black	-3.8935E-02	1.302E-02	.008	-7.0115E-02	-7.7552E-03
		Other	2.562E-02	1.830E-02	.485	-1.8209E-02	6.945E-02
	Black	White	3.893E-02	1.302E-02	.008	7.755E-03	7.011E-02
		Other	6.456E-02	1.808E-02	.001	2.124E-02	.1079
	Other	White	-2.5621E-02	1.830E-02	.485	-6.9452E-02	1.821E-02
		Black	-6.4556E-02	1.808E-02	.001	-.1079	-2.1245E-02

* Mean difference is significant at .05 ...

TABLE B7. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 7B

	Accession Source(I)	Accession Source(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	7.873E-03	1.287E-02	.814	-2.2293E-02	3.804E-02
		Other	.1183	1.809E-02	.000	7.593E-02	.1607
	Black	White	-7.8731E-03	1.287E-02	.814	-3.8039E-02	2.229E-02
		Other	.1105	1.788E-02	.000	6.856E-02	.1524
	Other	White	-.1183	1.809E-02	.000	-.1607	-7.5932E-02
		Black	-.1105	1.788E-02	.000	-.1524	-6.8561E-02
Scheffe	White	Black	7.873E-03	1.287E-02	.829	-2.3648E-02	3.939E-02
		Other	.1183	1.809E-02	.000	7.403E-02	.1626
	Black	White	-7.8731E-03	1.287E-02	.829	-3.9394E-02	2.365E-02
		Other	.1105	1.788E-02	.000	6.668E-02	.1542
	Other	White	-.1183	1.809E-02	.000	-.1626	-7.4027E-02
		Black	-.1105	1.788E-02	.000	-.1542	-6.6679E-02
Bonferroni	White	Black	7.873E-03	1.287E-02	1.000	-2.2957E-02	3.870E-02
		Other	.1183	1.809E-02	.000	7.500E-02	.1617
	Black	White	-7.8731E-03	1.287E-02	1.000	-3.8703E-02	2.296E-02
		Other	.1105	1.788E-02	.000	6.764E-02	.1533
	Other	White	-.1183	1.809E-02	.000	-.1617	-7.4998E-02
		Black	-.1105	1.788E-02	.000	-.1533	-6.7638E-02

* Mean difference is significant at .05 ...

TABLE B8. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 8

	Accession Source(I)	Accession Source(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	2.668E-02	1.231E-02	.077	-2.1824E-03	5.554E-02
		Other	6.042E-02	1.731E-02	.001	1.985E-02	.1010
	Black	White	-2.6679E-02	1.231E-02	.077	-5.5541E-02	2.182E-03
		Other	3.374E-02	1.711E-02	.119	-6.3523E-03	7.383E-02
	Other	White	-6.0418E-02	1.731E-02	.001	-.1010	-1.9847E-02
		Black	-3.3739E-02	1.711E-02	.119	-7.3831E-02	6.352E-03
Scheffe	White	Black	2.668E-02	1.231E-02	.096	-3.4786E-03	5.684E-02
		Other	6.042E-02	1.731E-02	.002	1.802E-02	.1028
	Black	White	-2.6679E-02	1.231E-02	.096	5.6837E-02	3.479E-03
		Other	3.374E-02	1.711E-02	.143	-8.1529E-03	7.563E-02
	Other	White	-6.0418E-02	1.731E-02	.002	-.1028	-1.8024E-02
		Black	-3.3739E-02	1.711E-02	.143	-7.5631E-02	8.153E-03
Bonferroni	White	Black	2.668E-02	1.231E-02	.091	-2.8180E-03	5.618E-02
		Other	6.042E-02	1.731E-02	.001	1.895E-02	.1019
	Black	White	-2.6679E-02	1.231E-02	.091	-5.6176E-02	2.818E-03
		Other	3.374E-02	1.711E-02	.146	-7.2352E-03	7.471E-02
	Other	White	-6.0418E-02	1.731E-02	.001	-.1019	-1.8953E-02
		Black	-3.3739E-02	1.711E-02	.146	-7.4713E-02	7.235E-03

* Mean difference is significant at .05 …

TABLE B9. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNITS 9/10

	Accession Source(I)	Accession Source(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	-1.8903E-02	1.024E-02	.155	-4.2894E-02	5.087E-03
		Other	1.716E-02	1.439E-02	.457	-1.6561E-02	5.089E-02
	Black	White	1.890E-02	1.024E-02	.155	-5.0870E-03	4.289E-02
		Other	3.607E-02	1.422E-02	.030	2.741E-03	6.939E-02
	Other	White	-1.7163E-02	1.439E-02	.457	-5.0887E-02	1.656E-02
		Black	-3.6066E-02	1.422E-02	.030	-6.9391E-02	-2.7414E-03
Scheffe	White	Black	-1.8903E-02	1.024E-02	.182	-4.3971E-02	6.164E-03
		Other	1.716E-02	1.439E-02	.491	-1.8076E-02	5.240E-02
	Black	White	1.890E-02	1.024E-02	.182	-6.1645E-03	4.397E-02
		Other	3.607E-02	1.422E-02	.040	1.245E-03	7.089E-02
	Other	White	-1.7163E-02	1.439E-02	.491	-5.2402E-02	1.808E-02
		Black	-3.6066E-02	1.422E-02	.040	-7.0888E-02	-1.2447E-03
Bonferroni	White	Black	-1.8903E-02	1.024E-02	.195	-4.3422E-02	5.615E-03
		Other	1.716E-02	1.439E-02	.699	-1.7304E-02	5.163E-02
	Black	White	1.890E-02	1.024E-02	.195	-5.6153E-03	4.342E-02
		Other	3.607E-02	1.422E-02	.034	2.008E-03	7.013E-02
	Other	White	-1.7163E-02	1.439E-02	.699	-5.1630E-02	1.730E-02
		Black	-3.6066E-02	1.422E-02	.034	-7.0125E-02	-2.0075E-03

* Mean difference is significant at .05 …

TABLE B10.MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 11

	Accession Source(I)	Accession Source(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	-4.5552E-02	1.059E-02	.000	-7.0364E-02	-2.0740E-02
		Other	-1.0910E-02	1.488E-02	.744	-4.5788E-02	2.397E-02
	Black	White	4.555E-02	1.059E-02	.000	2.074E-02	7.036E-02
		Other	3.464E-02	1.471E-02	.049	1.762E-04	6.911E-02
	Other	White	1.091E-02	1.488E-02	.744	-2.3969E-02	4.579E-02
		Black	-3.4642E-02	1.471E-02	.049	-6.9108E-02	-1.7624E-04
Scheffe	White	Black	-4.5552E-02	1.059E-02	.000	-7.1478E-02	-1.9626E-02
		Other	-1.0910E-02	1.488E-02	.764	-4.7355E-02	2.554E-02
	Black	White	4.555E-02	1.059E-02	.000	1.963E-02	7.148E-02
		Other	3.464E-02	1.471E-02	.063	-1.3717E-03	7.066E-02
	Other	White	1.091E-02	1.488E-02	.764	-2.5535E-02	4.735E-02
		Black	-3.4642E-02	1.471E-02	.063	-7.0656E-02	1.372E-03
Bonferroni	White	Black	-4.5552E-02	1.059E-02	.000	-7.0910E-02	-2.0194E-02
		Other	-1.0910E-02	1.488E-02	1.000	-4.6557E-02	2.474E-02
	Black	White	4.555E-02	1.059E-02	.000	2.019E-02	7.091E-02
		Other	3.464E-02	1.471E-02	.056	-5.8278E-04	6.987E-02
	Other	White	1.091E-02	1.488E-02	1.000	-2.4737E-02	4.656E-02
		Black	-3.4642E-02	1.471E-02	.056	-6.9867E-02	5.828E-04

* Mean difference is significant at .05 …

TABLE B11.MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF OVERALL PERFORMANCE

	Accession Source(I)	Accession Source(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	White	Black	-1.0143E-02	6.192E-03	.230	-2.4656E-02	4.369E-03
		Other	4.073E-02	8.705E-03	.000	2.032E-02	6.113E-02
	Black	White	1.014E-02	6.192E-03	.230	-4.3693E-03	2.466E-02
		Other	5.087E-02	8.602E-03	.000	3.071E-02	7.103E-02
	Other	White	-4.0725E-02	8.705E-03	.000	-6.1126E-02	-2.0324E-02
		Black	-5.0869E-02	8.602E-03	.000	-7.1028E-02	-3.0709E-02
Scheffe	White	Black	-1.0143E-02	6.192E-03	.262	-2.5308E-02	5.021E-03
		Other	4.073E-02	8.705E-03	.000	1.941E-02	6.204E-02
	Black	White	1.014E-02	6.192E-03	.262	-5.0211E-03	2.531E-02
		Other	5.087E-02	8.602E-03	.000	2.980E-02	7.193E-02
	Other	White	-4.0725E-02	8.705E-03	.000	-6.2043E-02	-1.9408E-02
		Black	-5.0869E-02	8.602E-03	.000	-7.1934E-02	-2.9804E-02
Bonferroni	White	Black	-1.0143E-02	6.192E-03	.305	-2.4976E-02	4.689E-03
		Other	4.073E-02	8.705E-03	.000	1.987E-02	6.158E-02
	Black	White	1.014E-02	6.192E-03	.305	-4.6889E-03	2.498E-02
		Other	5.087E-02	8.602E-03	.000	3.027E-02	7.147E-02
	Other	White	-4.0725E-02	8.705E-03	.000	-6.1576E-02	-1.9875E-02
		Black	-5.0869E-02	8.602E-03	.000	-7.1472E-02	-3.0265E-02

* Mean difference is significant at .05 ...

APPENDIX C. POST-HOC QUERIES FOR UNDERGRADUATE INSTITUTION ADMISSIONS SELECTIVITY ONE WAY ANOVA COMPARISONS

TABLE C1. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 1

	Undergrad Selectivity(I)	Undergrad Selectivity(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Less/Non	Competitive	-3.4697E-02	1.610E-02	.197	-7.8627E-02	9.232E-03
		Very	-5.3500E-02	1.700E-02	.014	-9.9875E-02	-7.1253E-03
		Highly	-5.1777E-02	1.667E-02	.016	-9.7261E-02	-6.2939E-03
		Most	-8.2181E-02	1.431E-02	.000	-.1212	-4.3148E-02
	Competitive	Less/Non	3.470E-02	1.610E-02	.197	-9.2321E-03	7.863E-02
		Very	-1.8803E-02	1.349E-02	.631	-5.5594E-02	1.799E-02
		Highly	-1.7080E-02	1.307E-02	.687	-5.2741E-02	1.858E-02
		Most	-4.7484E-02	9.882E-03	.000	-7.4439E-02	-2.0529E-02
	Very	Less/Non	5.350E-02	1.700E-02	.014	7.125E-03	9.987E-02
		Competitive	1.880E-02	1.349E-02	.631	-1.7988E-02	5.559E-02
		Highly	1.723E-03	1.416E-02	1.000	-3.6911E-02	4.036E-02
		Most	-2.8681E-02	1.128E-02	.082	-5.9461E-02	2.099E-03
	Highly	Less/Non	5.178E-02	1.667E-02	.016	6.294E-03	9.726E-02
		Competitive	1.708E-02	1.307E-02	.687	-1.8581E-02	5.274E-02
		Very	-1.7226E-03	1.416E-02	1.000	-4.0356E-02	3.691E-02
		Most	-3.0404E-02	1.079E-02	.039	-5.9824E-02	-9.8380E-04
	Most	Less/Non	8.218E-02	1.431E-02	.000	4.315E-02	.1212
		Competitive	4.748E-02	9.882E-03	.000	2.053E-02	7.444E-02
		Very	2.868E-02	1.128E-02	.082	-2.0988E-03	5.946E-02
		Highly	3.040E-02	1.079E-02	.039	9.838E-04	5.982E-02
Scheffe	Less/Non	Competitive	-3.4697E-02	1.610E-02	.326	-8.4333E-02	1.494E-02
		Very	-5.3500E-02	1.700E-02	.042	-.1059	-1.1011E-03
		Highly	-5.1777E-02	1.667E-02	.047	-.1032	-3.8547E-04
		Most	-8.2181E-02	1.431E-02	.000	-.1263	-3.8077E-02
	Competitive	Less/Non	3.470E-02	1.610E-02	.326	-1.4939E-02	8.433E-02
		Very	-1.8803E-02	1.349E-02	.746	-6.0373E-02	2.277E-02
		Highly	-1.7080E-02	1.307E-02	.789	-5.7374E-02	2.321E-02
		Most	-4.7484E-02	9.882E-03	.000	-7.7941E-02	-1.7027E-02
	Very	Less/Non	5.350E-02	1.700E-02	.042	1.101E-03	.1059
		Competitive	1.880E-02	1.349E-02	.746	-2.2768E-02	6.037E-02
		Highly	1.723E-03	1.416E-02	1.000	-4.1929E-02	4.537E-02
		Most	-2.8681E-02	1.128E-02	.168	-6.3460E-02	6.097E-03
	Highly	Less/Non	5.178E-02	1.667E-02	.047	3.855E-04	.1032
		Competitive	1.708E-02	1.307E-02	.789	-2.3214E-02	5.737E-02
		Very	-1.7226E-03	1.416E-02	1.000	-4.5375E-02	4.193E-02
		Most	-3.0404E-02	1.079E-02	.094	-6.3646E-02	2.838E-03
	Most	Less/Non	8.218E-02	1.431E-02	.000	3.808E-02	.1263
		Competitive	4.748E-02	9.882E-03	.000	1.703E-02	7.794E-02
		Very	2.868E-02	1.128E-02	.168	-6.0972E-03	6.346E-02
		Highly	3.040E-02	1.079E-02	.094	-2.8380E-03	6.365E-02

* Mean difference is significant at .05 ...

TABLE C2. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNITS 2/3

	Undergrad Selectivity(I)	Undergrad Selectivity(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Less/Non	Competitive	-3.5621E-02	2.088E-02	.430	-9.2584E-02	2.134E-02
		Very	-7.4308E-02	2.204E-02	.007	-.1344	-1.4174E-02
		Highly	-8.9765E-02	2.162E-02	.000	-.1487	-3.0787E-02
		Most	-.1092	1.856E-02	.000	-.1598	-5.8540E-02
	Competitive	Less/Non	3.562E-02	2.088E-02	.430	-2.1342E-02	9.258E-02
		Very	-3.8687E-02	1.749E-02	.175	-8.6394E-02	9.020E-03
		Highly	-5.4144E-02	1.695E-02	.012	-.1004	-7.9023E-03
		Most	-7.3534E-02	1.281E-02	.000	-.1085	-3.8581E-02
	Very	Less/Non	7.431E-02	2.204E-02	.007	1.417E-02	.1344
		Competitive	3.869E-02	1.749E-02	.175	-9.0200E-03	8.639E-02
		Highly	-1.5457E-02	1.836E-02	.918	-6.5553E-02	3.464E-02
		Most	-3.4847E-02	1.463E-02	.120	-7.4759E-02	5.065E-03
	Highly	Less/Non	8.976E-02	2.162E-02	.000	3.079E-02	.1487
		Competitive	5.414E-02	1.695E-02	.012	7.902E-03	.1004
		Very	1.546E-02	1.836E-02	.918	-3.4638E-02	6.555E-02
		Most	-1.9390E-02	1.399E-02	.636	-5.7539E-02	1.876E-02
	Most	Less/Non	.1092	1.856E-02	.000	5.854E-02	.1598
		Competitive	7.353E-02	1.281E-02	.000	3.858E-02	.1085
		Very	3.485E-02	1.463E-02	.120	-5.0654E-03	7.476E-02
		Highly	1.939E-02	1.399E-02	.636	-1.8759E-02	5.754E-02
Scheffe	Less/Non	Competitive	-3.5621E-02	2.088E-02	.573	-9.9984E-02	2.874E-02
		Very	-7.4308E-02	2.204E-02	.023	-.1423	-6.3625E-03
		Highly	-8.9765E-02	2.162E-02	.002	-.1564	-2.3125E-02
		Most	-.1092	1.856E-02	.000	-.1663	-5.1965E-02
	Competitive	Less/Non	3.562E-02	2.088E-02	.573	-2.8741E-02	9.998E-02
		Very	-3.8687E-02	1.749E-02	.299	-9.2591E-02	1.522E-02
		Highly	-5.4144E-02	1.695E-02	.037	-.1064	-1.8954E-03
		Most	-7.3534E-02	1.281E-02	.000	-.1130	-3.4040E-02
	Very	Less/Non	7.431E-02	2.204E-02	.023	6.363E-03	.1423
		Competitive	3.869E-02	1.749E-02	.299	-1.5217E-02	9.259E-02
		Highly	-1.5457E-02	1.836E-02	.950	-7.2060E-02	4.115E-02
		Most	-3.4847E-02	1.463E-02	.225	-7.9944E-02	1.025E-02
	Highly	Less/Non	8.976E-02	2.162E-02	.002	2.313E-02	.1564
		Competitive	5.414E-02	1.695E-02	.037	1.895E-03	.1064
		Very	1.546E-02	1.836E-02	.950	-4.1146E-02	7.206E-02
		Most	-1.9390E-02	1.399E-02	.750	-6.2494E-02	2.371E-02
	Most	Less/Non	.1092	1.856E-02	.000	5.197E-02	.1663
		Competitive	7.353E-02	1.281E-02	.000	3.404E-02	.1130
		Very	3.485E-02	1.463E-02	.225	-1.0250E-02	7.994E-02
		Highly	1.939E-02	1.399E-02	.750	-2.3715E-02	6.249E-02

* Mean difference is significant at .05 ...

TABLE C3. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 4

	Undergrad Selectivity(I)	Undergrad Selectivity(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Less/Non	Competitive	4.767E-03	1.755E-02	.999	-4.3114E-02	5.265E-02
		Very	-1.0020E-02	1.853E-02	.983	-6.0566E-02	4.053E-02
		Highly	-1.5116E-02	1.817E-02	.921	-6.4692E-02	3.446E-02
		Most	-2.2633E-02	1.560E-02	.594	-6.5178E-02	1.991E-02
	Competitive	Less/Non	-4.7667E-03	1.755E-02	.999	-5.2648E-02	4.311E-02
		Very	-1.4787E-02	1.470E-02	.853	-5.4887E-02	2.531E-02
		Highly	-1.9883E-02	1.425E-02	.631	-5.8752E-02	1.899E-02
		Most	-2.7400E-02	1.077E-02	.081	-5.6780E-02	1.981E-03
	Very	Less/Non	1.002E-02	1.853E-02	.983	-4.0527E-02	6.057E-02
		Competitive	1.479E-02	1.470E-02	.853	-2.5314E-02	5.489E-02
		Highly	-5.0966E-03	1.544E-02	.997	-4.7205E-02	3.701E-02
		Most	-1.2613E-02	1.230E-02	.844	-4.6162E-02	2.094E-02
	Highly	Less/Non	1.512E-02	1.817E-02	.921	-3.4459E-02	6.469E-02
		Competitive	1.988E-02	1.425E-02	.631	-1.8986E-02	5.875E-02
		Very	5.097E-03	1.544E-02	.997	-3.7012E-02	4.721E-02
		Most	-7.5164E-03	1.176E-02	.969	-3.9583E-02	2.455E-02
	Most	Less/Non	2.263E-02	1.560E-02	.594	-1.9912E-02	6.518E-02
		Competitive	2.740E-02	1.077E-02	.081	-1.9806E-03	5.678E-02
		Very	1.261E-02	1.230E-02	.844	-2.0936E-02	4.616E-02
		Highly	7.516E-03	1.176E-02	.969	-2.4550E-02	3.958E-02
Scheffe	Less/Non	Competitive	4.767E-03	1.755E-02	.999	-4.9334E-02	5.887E-02
		Very	-1.0020E-02	1.853E-02	.990	-6.7133E-02	4.709E-02
		Highly	-1.5116E-02	1.817E-02	.952	-7.1132E-02	4.090E-02
		Most	-2.2633E-02	1.560E-02	.716	-7.0705E-02	2.544E-02
	Competitive	Less/Non	-4.7667E-03	1.755E-02	.999	-5.8868E-02	4.933E-02
		Very	-1.4787E-02	1.470E-02	.908	-6.0097E-02	3.052E-02
		Highly	-1.9883E-02	1.425E-02	.745	-6.3802E-02	2.404E-02
		Most	-2.7400E-02	1.077E-02	.167	-6.0596E-02	5.797E-03
	Very	Less/Non	1.002E-02	1.853E-02	.990	-4.7093E-02	6.713E-02
		Competitive	1.479E-02	1.470E-02	.908	-3.0523E-02	6.010E-02
		Highly	-5.0966E-03	1.544E-02	.999	-5.2676E-02	4.248E-02
		Most	-1.2613E-02	1.230E-02	.902	-5.0520E-02	2.529E-02
	Highly	Less/Non	1.512E-02	1.817E-02	.952	-4.0899E-02	7.113E-02
		Competitive	1.988E-02	1.425E-02	.745	-2.4035E-02	6.380E-02
		Very	5.097E-03	1.544E-02	.999	-4.2482E-02	5.268E-02
		Most	-7.5164E-03	1.176E-02	.982	-4.3749E-02	2.872E-02
	Most	Less/Non	2.263E-02	1.560E-02	.716	-2.5439E-02	7.070E-02
		Competitive	2.740E-02	1.077E-02	.167	-5.7972E-03	6.060E-02
		Very	1.261E-02	1.230E-02	.902	-2.5294E-02	5.052E-02
		Highly	7.516E-03	1.176E-02	.982	-2.8716E-02	4.375E-02

* Mean difference is significant at .05 ...

TABLE C4. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 5

	Undergrad Selectivity(I)	Undergrad Selectivity(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Less/Non	Competitive	-6.7617E-04	3.026E-02	1.000	-8.3208E-02	8.186E-02
		Very	-1.7665E-02	3.194E-02	.982	-.1048	6.946E-02
		Highly	-2.8310E-02	3.133E-02	.896	-.1138	5.714E-02
		Most	-4.9809E-02	2.688E-02	.343	-.1231	2.352E-02
	Competitive	Less/Non	6.762E-04	3.026E-02	1.000	-8.1855E-02	8.321E-02
		Very	-1.6989E-02	2.534E-02	.963	-8.6110E-02	5.213E-02
		Highly	-2.7634E-02	2.456E-02	.793	-9.4632E-02	3.936E-02
		Most	-4.9133E-02	1.857E-02	.062	-9.9775E-02	1.509E-03
	Very	Less/Non	1.767E-02	3.194E-02	.982	-6.9460E-02	.1048
		Competitive	1.699E-02	2.534E-02	.963	-5.2132E-02	8.611E-02
		Highly	-1.0645E-02	2.661E-02	.995	-8.3227E-02	6.194E-02
		Most	-3.2144E-02	2.120E-02	.552	-8.9972E-02	2.568E-02
	Highly	Less/Non	2.831E-02	3.133E-02	.896	-5.7141E-02	.1138
		Competitive	2.763E-02	2.456E-02	.793	-3.9364E-02	9.463E-02
		Very	1.064E-02	2.661E-02	.995	-6.1937E-02	8.323E-02
		Most	-2.1499E-02	2.026E-02	.826	-7.6772E-02	3.377E-02
	Most	Less/Non	4.981E-02	2.688E-02	.343	-2.3524E-02	.1231
		Competitive	4.913E-02	1.857E-02	.062	-1.5087E-03	9.978E-02
		Very	3.214E-02	2.120E-02	.552	2.5684E-02	8.997E-02
		Highly	2.150E-02	2.026E-02	.826	-3.3774E-02	7.677E-02
Scheffe	Less/Non	Competitive	-6.7617E-04	3.026E-02	1.000	-9.3929E-02	9.258E-02
		Very	-1.7665E-02	3.194E-02	.989	-.1161	8.078E-02
		Highly	-2.8310E-02	3.133E-02	.936	-.1249	6.824E-02
		Most	-4.9809E-02	2.688E-02	.488	-.1327	3.305E-02
	Competitive	Less/Non	6.762E-04	3.026E-02	1.000	-9.2577E-02	9.393E-02
		Very	-1.6989E-02	2.534E-02	.978	-9.5089E-02	6.111E-02
		Highly	-2.7634E-02	2.456E-02	.867	-.1033	4.807E-02
		Most	-4.9133E-02	1.857E-02	.136	-.1064	8.087E-03
	Very	Less/Non	1.767E-02	3.194E-02	.989	-8.0778E-02	.1161
		Competitive	1.699E-02	2.534E-02	.978	-6.1111E-02	9.509E-02
		Highly	-1.0645E-02	2.661E-02	.997	-9.2656E-02	7.137E-02
		Most	-3.2144E-02	2.120E-02	.681	-9.7484E-02	3.320E-02
	Highly	Less/Non	2.831E-02	3.133E-02	.936	-6.8241E-02	.1249
		Competitive	2.763E-02	2.456E-02	.867	-4.8067E-02	.1033
		Very	1.064E-02	2.661E-02	.997	-7.1366E-02	9.266E-02
		Most	-2.1499E-02	2.026E-02	.890	-8.3952E-02	4.095E-02
	Most	Less/Non	4.981E-02	2.688E-02	.488	-3.3050E-02	.1327
		Competitive	4.913E-02	1.857E-02	.136	-8.0873E-03	.1064
		Very	3.214E-02	2.120E-02	.681	-3.3196E-02	9.748E-02
		Highly	2.150E-02	2.026E-02	.890	-4.0954E-02	8.395E-02

* Mean difference is signifiant at .05 ...

TABLE C5. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 6

	Undergrad Selectivity(I)	Undergrad Selectivity(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Less/Non	Competitive	-2.8002E-02	1.999E-02	.627	-8.2527E-02	2.652E-02
		Very	-5.9577E-02	2.110E-02	.038	-.1171	-2.0159E-03
		Highly	-8.5638E-02	2.070E-02	.000	-.1421	-2.9184E-02
		Most	-6.8217E-02	1.776E-02	.001	-.1167	-1.9769E-02
	Competitive	Less/Non	2.800E-02	1.999E-02	.627	-2.6524E-02	8.253E-02
		Very	-3.1575E-02	1.674E-02	.325	-7.7240E-02	1.409E-02
		Highly	-5.7637E-02	1.623E-02	.004	-.1019	-1.3374E-02
		Most	-4.0216E-02	1.227E-02	.009	-7.3673E-02	-6.7583E-03
	Very	Less/Non	5.958E-02	2.110E-02	.038	2.016E-03	.1171
		Competitive	3.157E-02	1.674E-02	.325	-1.4091E-02	7.724E-02
		Highly	-2.6062E-02	1.758E-02	.574	-7.4014E-02	2.189E-02
		Most	-8.6409E-03	1.401E-02	.972	-4.6845E-02	2.956E-02
	Highly	Less/Non	8.564E-02	2.070E-02	.000	2.918E-02	.1421
		Competitive	5.764E-02	1.623E-02	.004	1.337E-02	.1019
		Very	2.606E-02	1.758E-02	.574	-2.1890E-02	7.401E-02
		Most	1.742E-02	1.339E-02	.690	-1.9095E-02	5.394E-02
	Most	Less/Non	6.822E-02	1.776E-02	.001	1.977E-02	.1167
		Competitive	4.022E-02	1.227E-02	.009	6.758E-03	7.367E-02
		Very	8.641E-03	1.401E-02	.972	-2.9564E-02	4.685E-02
		Highly	-1.7421E-02	1.339E-02	.690	-5.3938E-02	1.910E-02
Scheffe	Less/Non	Competitive	-2.8002E-02	1.999E-02	.743	-8.9611E-02	3.361E-02
		Very	-5.9577E-02	2.110E-02	.093	-.1246	5.461E-03
		Highly	-8.5638E-02	2.070E-02	.002	-.1494	-2.1850E-02
		Most	-6.8217E-02	1.776E-02	.005	-.1230	-1.3475E-02
	Competitive	Less/Non	2.800E-02	1.999E-02	.743	-3.3607E-02	8.961E-02
		Very	-3.1575E-02	1.674E-02	.469	-8.3172E-02	2.002E-02
		Highly	-5.7637E-02	1.623E-02	.013	-.1076	-7.6237E-03
		Most	-4.0216E-02	1.227E-02	.030	-7.8019E-02	-2.4121E-03
	Very	Less/Non	5.958E-02	2.110E-02	.093	-5.4614E-03	.1246
		Competitive	3.157E-02	1.674E-02	.469	-2.0023E-02	8.317E-02
		Highly	-2.6062E-02	1.758E-02	.699	-8.0243E-02	2.812E-02
		Most	-8.6409E-03	1.401E-02	.984	-5.1808E-02	3.453E-02
	Highly	Less/Non	8.564E-02	2.070E-02	.002	2.185E-02	.1494
		Competitive	5.764E-02	1.623E-02	.013	7.624E-03	.1076
		Very	2.606E-02	1.758E-02	.699	-2.8119E-02	8.024E-02
		Most	1.742E-02	1.339E-02	.792	-2.3839E-02	5.868E-02
	Most	Less/Non	6.822E-02	1.776E-02	.005	1.348E-02	.1230
		Competitive	4.022E-02	1.227E-02	.030	2.412E-03	7.802E-02
		Very	8.641E-03	1.401E-02	.984	-3.4526E-02	5.181E-02
		Highly	-1.7421E-02	1.339E-02	.792	-5.8681E-02	2.384E-02

* Mean difference is significant at .05 ...

TABLE C6. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 7A

	Undergrad Selectivity(I)	Undergrad Selectivity(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Less/Non	Competitive	-1.3700E-03	2.823E-02	1.000	-7.8377E-02	7.564E-02
		Very	-5.8632E-02	2.980E-02	.282	-.1399	2.266E-02
		Highly	-5.8127E-02	2.923E-02	.271	-.1379	2.160E-02
		Most	-5.1254E-02	2.508E-02	.245	-.1197	1.717E-02
	Competitive	Less/Non	1.370E-03	2.823E-02	1.000	-7.5637E-02	7.838E-02
		Very	-5.7262E-02	2.364E-02	.109	-.1218	7.232E-03
		Highly	-5.6757E-02	2.292E-02	.096	-.1193	5.756E-03
		Most	-4.9884E-02	1.732E-02	.032	-9.7137E-02	-2.6323E-03
	Very	Less/Non	5.863E-02	2.980E-02	.282	-2.2661E-02	.1399
		Competitive	5.726E-02	2.364E-02	.109	-7.2316E-03	.1218
		Highly	5.055E-04	2.483E-02	1.000	-6.7218E-02	6.823E-02
		Most	7.378E-03	1.978E-02	.996	4.6579E-02	6.133E-02
	Highly	Less/Non	5.813E-02	2.923E-02	.271	-2.1605E-02	.1379
		Competitive	5.676E-02	2.292E-02	.096	-5.7563E-03	.1193
		Very	-5.0548E-04	2.483E-02	1.000	-6.8229E-02	6.722E-02
		Most	6.873E-03	1.891E-02	.996	-4.4700E-02	5.845E-02
	Most	Less/Non	5.125E-02	2.508E-02	.245	-1.7170E-02	.1197
		Competitive	4.988E-02	1.732E-02	.032	2.632E-03	9.714E-02
		Very	-7.3780E-03	1.978E-02	.996	-6.1335E-02	4.658E-02
		Highly	-6.8725E-03	1.891E-02	.996	-5.8445E-02	4.470E-02
Scheffe	Less/Non	Competitive	-1.3700E-03	2.823E-02	1.000	-8.8381E-02	8.564E-02
		Very	-5.8632E-02	2.980E-02	.424	-.1505	3.322E-02
		Highly	-5.8127E-02	2.923E-02	.412	-.1482	3.196E-02
		Most	-5.1254E-02	2.508E-02	.383	-.1286	2.606E-02
	Competitive	Less/Non	1.370E-03	2.823E-02	1.000	-8.5641E-02	8.838E-02
		Very	-5.7262E-02	2.364E-02	.210	-.1301	1.561E-02
		Highly	-5.6757E-02	2.292E-02	.190	-.1274	1.388E-02
		Most	-4.9884E-02	1.732E-02	.082	-.1033	3.506E-03
	Very	Less/Non	5.863E-02	2.980E-02	.424	-3.3222E-02	.1505
		Competitive	5.726E-02	2.364E-02	.210	-1.5610E-02	.1301
		Highly	5.055E-04	2.483E-02	1.000	-7.6016E-02	7.703E-02
		Most	7.378E-03	1.978E-02	.998	-5.3588E-02	6.834E-02
	Highly	Less/Non	5.813E-02	2.923E-02	.412	-3.1962E-02	.1482
		Competitive	5.676E-02	2.292E-02	.190	-1.3877E-02	.1274
		Very	-5.0548E-04	2.483E-02	1.000	-7.7027E-02	7.602E-02
		Most	6.873E-03	1.891E-02	.998	-5.1400E-02	6.514E-02
	Most	Less/Non	5.125E-02	2.508E-02	.383	-2.6059E-02	.1286
		Competitive	4.988E-02	1.732E-02	.082	-3.5059E-03	.1033
		Very	-7.3780E-03	1.978E-02	.998	-6.8344E-02	5.359E-02
		Highly	-6.8725E-03	1.891E-02	.998	-6.5145E-02	5.140E-02

* Mean difference is significant at .05 ...

TABLE C7. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 7B

	Undergrad Selectivity(I)	Undergrad Selectivity(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Less/Non	Competitive	-2.2415E-02	2.790E-02	.930	-9.8516E-02	5.369E-02
		Very	-1.2286E-02	2.945E-02	.994	-9.2623E-02	6.805E-02
		Highly	-9.8512E-02	2.889E-02	.006	-.1773	-1.9719E-02
		Most	-.1011	2.479E-02	.000	-.1687	-3.3489E-02
	Competitive	Less/Non	2.241E-02	2.790E-02	.930	-5.3686E-02	9.852E-02
		Very	1.013E-02	2.337E-02	.993	-5.3606E-02	7.386E-02
		Highly	-7.6097E-02	2.265E-02	.007	-.1379	-1.4320E-02
		Most	-7.8693E-02	1.712E-02	.000	-.1254	-3.1997E-02
	Very	Less/Non	1.229E-02	2.945E-02	.994	-6.8051E-02	9.262E-02
		Competitive	-1.0129E-02	2.337E-02	.993	-7.3864E-02	5.361E-02
		Highly	-8.6226E-02	2.454E-02	.004	-.1532	-1.9300E-02
		Most	-8.8822E-02	1.955E-02	.000	-.1421	-3.5501E-02
	Highly	Less/Non	9.851E-02	2.889E-02	.006	1.972E-02	.1773
		Competitive	7.610E-02	2.265E-02	.007	1.432E-02	.1379
		Very	8.623E-02	2.454E-02	.004	1.930E-02	.1532
		Most	-2.5962E-03	1.868E-02	1.000	-5.3562E-02	4.837E-02
	Most	Less/Non	.1011	2.479E-02	.000	3.349E-02	.1687
		Competitive	7.869E-02	1.712E-02	.000	3.200E-02	.1254
		Very	8.882E-02	1.955E-02	.000	3.550E-02	.1421
		Highly	2.596E-03	1.868E-02	1.000	-4.8370E-02	5.356E-02
Scheffe	Less/Non	Competitive	-2.2415E-02	2.790E-02	.958	-.1084	6.357E-02
		Very	-1.2286E-02	2.945E-02	.996	-.1031	7.849E-02
		Highly	-9.8512E-02	2.889E-02	.020	-.1875	-9.4834E-03
		Most	-.1011	2.479E-02	.002	-.1775	-2.4705E-02
	Competitive	Less/Non	2.241E-02	2.790E-02	.958	-6.3572E-02	.1084
		Very	1.013E-02	2.337E-02	.996	-6.1885E-02	8.214E-02
		Highly	-7.6097E-02	2.265E-02	.024	-.1459	-6.2944E-03
		Most	-7.8693E-02	1.712E-02	.000	-.1315	-2.5931E-02
	Very	Less/Non	1.229E-02	2.945E-02	.996	-7.8487E-02	.1031
		Competitive	-1.0129E-02	2.337E-02	.996	-8.2144E-02	6.189E-02
		Highly	-8.6226E-02	2.454E-02	.015	-.1618	-1.0606E-02
		Most	-8.8822E-02	1.955E-02	.000	-.1491	-2.8574E-02
	Highly	Less/Non	9.851E-02	2.889E-02	.020	9.483E-03	.1875
		Competitive	7.610E-02	2.265E-02	.024	6.294E-03	.1459
		Very	8.623E-02	2.454E-02	.015	1.061E-02	.1618
		Most	-2.5962E-03	1.868E-02	1.000	-6.0183E-02	5.499E-02
	Most	Less/Non	.1011	2.479E-02	.002	2.470E-02	.1775
		Competitive	7.869E-02	1.712E-02	.000	2.593E-02	.1315
		Very	8.882E-02	1.955E-02	.000	2.857E-02	.1491
		Highly	2.596E-03	1.868E-02	1.000	-5.4990E-02	6.018E-02

* Mean difference is significant at .05 ...

TABLE C8. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 8

	Undergrad Selectivity(I)	Undergrad Selectivity(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Less/Non	Competitive	-1.9789E-02	2.654E-02	.946	-9.2191E-02	5.261E-02
		Very	-7.9557E-02	2.802E-02	.037	-.1560	-3.1253E-03
		Highly	-.1010	2.748E-02	.002	-.1759	-2.6011E-02
		Most	-.1110	2.358E-02	.000	-.1754	-4.6704E-02
	Competitive	Less/Non	1.979E-02	2.654E-02	.946	-5.2613E-02	9.219E-02
		Very	-5.9768E-02	2.223E-02	.056	-.1204	8.688E-04
		Highly	-8.1185E-02	2.155E-02	.002	-.1400	-2.2410E-02
		Most	-9.1247E-02	1.629E-02	.000	-.1357	-4.6821E-02
	Very	Less/Non	7.956E-02	2.802E-02	.037	3.125E-03	.1560
		Competitive	5.977E-02	2.223E-02	.056	-8.6877E-04	.1204
		Highly	-2.1417E-02	2.334E-02	.890	-8.5090E-02	4.226E-02
		Most	-3.1479E-02	1.860E-02	.438	-8.2209E-02	1.925E-02
	Highly	Less/Non	.1010	2.748E-02	.002	2.601E-02	.1759
		Competitive	8.119E-02	2.155E-02	.002	2.241E-02	.1400
		Very	2.142E-02	2.334E-02	.890	-4.2256E-02	8.509E-02
		Most	-1.0062E-02	1.778E-02	.980	-5.8550E-02	3.843E-02
	Most	Less/Non	.1110	2.358E-02	.000	4.670E-02	.1754
		Competitive	9.125E-02	1.629E-02	.000	4.682E-02	.1357
		Very	3.148E-02	1.860E-02	.438	-1.9251E-02	8.221E-02
		Highly	1.006E-02	1.778E-02	.980	-3.8426E-02	5.855E-02
Scheffe	Less/Non	Competitive	-1.9789E-02	2.654E-02	.968	-.1016	6.202E-02
		Very	-7.9557E-02	2.802E-02	.090	-.1659	6.803E-03
		Highly	-.1010	2.748E-02	.009	-.1857	-1.6273E-02
		Most	-.1110	2.358E-02	.000	-.1837	-3.8346E-02
	Competitive	Less/Non	1.979E-02	2.654E-02	.968	-6.2018E-02	.1016
		Very	-5.9768E-02	2.223E-02	.125	-.1283	8.746E-03
		Highly	-8.1185E-02	2.155E-02	.007	-.1476	-1.4775E-02
		Most	-9.1247E-02	1.629E-02	.000	-.1414	-4.1050E-02
	Very	Less/Non	7.956E-02	2.802E-02	.090	-6.8035E-03	.1659
		Competitive	5.977E-02	2.223E-02	.125	-8.7457E-03	.1283
		Highly	-2.1417E-02	2.334E-02	.933	-9.3362E-02	5.053E-02
		Most	-3.1479E-02	1.860E-02	.581	-8.8799E-02	2.584E-02
	Highly	Less/Non	.1010	2.748E-02	.009	1.627E-02	.1857
		Competitive	8.119E-02	2.155E-02	.007	1.478E-02	.1476
		Very	2.142E-02	2.334E-02	.933	-5.0528E-02	9.336E-02
		Most	-1.0062E-02	1.778E-02	.988	-6.4849E-02	4.473E-02
	Most	Less/Non	.1110	2.358E-02	.000	3.835E-02	.1837
		Competitive	9.125E-02	1.629E-02	.000	4.105E-02	.1414
		Very	3.148E-02	1.860E-02	.581	-2.5841E-02	8.880E-02
		Highly	1.006E-02	1.778E-02	.988	-4.4725E-02	6.485E-02

* Mean difference is significant at .05 ...

TABLE C9. MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNITS 9/10

	Undergrad Selectivity(I)	Undergrad Selectivity(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Less/Non	Competitive	-1.3292E-02	2.212E-02	.975	-7.3617E-02	4.703E-02
		Very	-5.2497E-02	2.335E-02	.162	-.1162	1.119E-02
		Highly	-8.8942E-02	2.290E-02	.001	-.1514	-2.6483E-02
		Most	-6.0553E-02	1.965E-02	.018	-.1142	-6.9513E-03
	Competitive	Less/Non	1.329E-02	2.212E-02	.975	-4.7033E-02	7.362E-02
		Very	-3.9205E-02	1.852E-02	.213	-8.9728E-02	1.132E-02
		Highly	-7.5650E-02	1.795E-02	.000	-.1246	-2.6679E-02
		Most	-4.7261E-02	1.357E-02	.005	-8.4277E-02	-1.0245E-02
	Very	Less/Non	5.250E-02	2.335E-02	.162	-1.1186E-02	.1162
		Competitive	3.921E-02	1.852E-02	.213	-1.1317E-02	8.973E-02
		Highly	-3.6445E-02	1.945E-02	.331	-8.9497E-02	1.661E-02
		Most	-8.0557E-03	1.550E-02	.985	-5.0324E-02	3.421E-02
	Highly	Less/Non	8.894E-02	2.290E-02	.001	2.648E-02	.1514
		Competitive	7.565E-02	1.795E-02	.000	2.668E-02	.1246
		Very	3.644E-02	1.945E-02	.331	-1.6607E-02	8.950E-02
		Most	2.839E-02	1.481E-02	.308	-1.2011E-02	6.879E-02
	Most	Less/Non	6.055E-02	1.965E-02	.018	6.951E-03	.1142
		Competitive	4.726E-02	1.357E-02	.005	1.025E-02	8.428E-02
		Very	8.056E-03	1.550E-02	.985	-3.4212E-02	5.032E-02
		Highly	-2.8389E-02	1.481E-02	.308	-6.8789E-02	1.201E-02
Scheffe	Less/Non	Competitive	-1.3292E-02	2.212E-02	.986	-8.1453E-02	5.487E-02
		Very	-5.2497E-02	2.335E-02	.282	-.1245	1.946E-02
		Highly	-8.8942E-02	2.290E-02	.005	-.1595	-1.8370E-02
		Most	-6.0553E-02	1.965E-02	.050	-.1211	1.177E-05
	Competitive	Less/Non	1.329E-02	2.212E-02	.986	-5.4869E-02	8.145E-02
		Very	-3.9205E-02	1.852E-02	.345	-9.6291E-02	1.788E-02
		Highly	-7.5650E-02	1.795E-02	.001	-.1310	-2.0318E-02
		Most	-4.7261E-02	1.357E-02	.017	-8.9085E-02	-5.4368E-03
	Very	Less/Non	5.250E-02	2.335E-02	.282	-1.9458E-02	.1245
		Competitive	3.921E-02	1.852E-02	.345	-1.7880E-02	9.629E-02
		Highly	-3.6445E-02	1.945E-02	.476	-9.6389E-02	2.350E-02
		Most	-8.0557E-03	1.550E-02	.992	-5.5814E-02	3.970E-02
	Highly	Less/Non	8.894E-02	2.290E-02	.005	1.837E-02	.1595
		Competitive	7.565E-02	1.795E-02	.001	2.032E-02	.1310
		Very	3.644E-02	1.945E-02	.476	-2.3499E-02	9.639E-02
		Most	2.839E-02	1.481E-02	.452	-1.7259E-02	7.404E-02
	Most	Less/Non	6.055E-02	1.965E-02	.050	-1.1771E-05	.1211
		Competitive	4.726E-02	1.357E-02	.017	5.437E-03	8.909E-02
		Very	8.056E-03	1.550E-02	.992	-3.9703E-02	5.581E-02
		Highly	-2.8389E-02	1.481E-02	.452	-7.4038E-02	1.726E-02

* Mean difference is significant at .05 ...

TABLE C10.MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF UNIT 11

	Undergrad Selectivity(I)	Undergrad Selectivity(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Less/Non	Competitive	1.675E-02	2.299E-02	.950	-4.5953E-02	7.945E-02
		Very	5.882E-04	2.427E-02	1.000	-6.5603E-02	6.678E-02
		Highly	-3.6355E-02	2.380E-02	.544	-.1013	2.856E-02
		Most	6.131E-03	2.042E-02	.998	-4.9581E-02	6.184E-02
	Competitive	Less/Non	-1.6747E-02	2.299E-02	.950	-7.9448E-02	4.595E-02
		Very	-1.6159E-02	1.925E-02	.918	-6.8671E-02	3.635E-02
		Highly	-5.3102E-02	1.866E-02	.036	-.1040	-2.2027E-03
		Most	-1.0616E-02	1.410E-02	.944	-4.9089E-02	2.786E-02
	Very	Less/Non	-5.8818E-04	2.427E-02	1.000	-6.6779E-02	6.560E-02
		Competitive	1.616E-02	1.925E-02	.918	-3.6353E-02	6.867E-02
		Highly	-3.6943E-02	2.021E-02	.358	-9.2085E-02	1.820E-02
		Most	5.543E-03	1.611E-02	.997	-3.8389E-02	4.948E-02
	Highly	Less/Non	3.635E-02	2.380E-02	.544	-2.8564E-02	.1013
		Competitive	5.310E-02	1.866E-02	.036	2.203E-03	.1040
		Very	3.694E-02	2.021E-02	.358	-1.8199E-02	9.208E-02
		Most	4.249E-02	1.539E-02	.046	4.947E-04	8.448E-02
	Most	Less/Non	-6.1313E-03	2.042E-02	.998	-6.1844E-02	4.958E-02
		Competitive	1.062E-02	1.410E-02	.944	-2.7858E-02	4.909E-02
		Very	-5.5431E-03	1.611E-02	.997	-4.9476E-02	3.839E-02
		Highly	-4.2486E-02	1.539E-02	.046	-8.4478E-02	-4.9471E-04
Scheffe	Less/Non	Competitive	1.675E-02	2.299E-02	.970	-5.4099E-02	8.759E-02
		Very	5.882E-04	2.427E-02	1.000	-7.4201E-02	7.538E-02
		Highly	-3.6355E-02	2.380E-02	.675	-.1097	3.700E-02
		Most	6.131E-03	2.042E-02	.999	-5.6819E-02	6.908E-02
	Competitive	Less/Non	-1.6747E-02	2.299E-02	.970	-8.7593E-02	5.410E-02
		Very	-1.6159E-02	1.925E-02	.951	-7.5493E-02	4.317E-02
		Highly	-5.3102E-02	1.866E-02	.088	-.1106	4.409E-03
		Most	-1.0616E-02	1.410E-02	.967	-5.4087E-02	3.286E-02
	Very	Less/Non	-5.8818E-04	2.427E-02	1.000	-7.5378E-02	7.420E-02
		Competitive	1.616E-02	1.925E-02	.951	-4.3175E-02	7.549E-02
		Highly	-3.6943E-02	2.021E-02	.503	-9.9248E-02	2.536E-02
		Most	5.543E-03	1.611E-02	.998	-4.4096E-02	5.518E-02
	Highly	Less/Non	3.635E-02	2.380E-02	.675	-3.6997E-02	.1097
		Competitive	5.310E-02	1.866E-02	.088	-4.4093E-03	.1106
		Very	3.694E-02	2.021E-02	.503	-2.5362E-02	9.925E-02
		Most	4.249E-02	1.539E-02	.107	-4.9601E-03	8.993E-02
	Most	Less/Non	-6.1313E-03	2.042E-02	.999	-6.9081E-02	5.682E-02
		Competitive	1.062E-02	1.410E-02	.967	-3.2855E-02	5.409E-02
		Very	-5.5431E-03	1.611E-02	.998	-5.5183E-02	4.410E-02
		Highly	-4.2486E-02	1.539E-02	.107	-8.9933E-02	4.960E-03

* Mean difference is significant at .05 ...

TABLE C11.MULTIPLE COMPARISONS WITH DEPENDENT VARIABLE OF OVERALL PERFORMANCE

	Undergrad Selectivity(I)	Undergrad Selectivity(J)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Less/Non	Competitive	-1.2808E-02	1.336E-02	.874	-4.9250E-02	2.363E-02
		Very	-4.1946E-02	1.410E-02	.025	-8.0417E-02	-3.4760E-03
		Highly	-6.4268E-02	1.383E-02	.000	-.1020	-2.6537E-02
		Most	-6.4343E-02	1.187E-02	.000	-9.6723E-02	-3.1962E-02
	Competitive	Less/Non	1.281E-02	1.336E-02	.874	-2.3634E-02	4.925E-02
		Very	-2.9138E-02	1.119E-02	.070	-5.9659E-02	1.382E-03
		Highly	-5.1460E-02	1.085E-02	.000	-8.1043E-02	-2.1878E-02
		Most	-5.1535E-02	8.197E-03	.000	-7.3896E-02	-2.9174E-02
	Very	Less/Non	4.195E-02	1.410E-02	.025	3.476E-03	8.042E-02
		Competitive	2.914E-02	1.119E-02	.070	-1.3818E-03	5.966E-02
		Highly	-2.2322E-02	1.175E-02	.317	-5.4371E-02	9.726E-03
		Most	-2.2396E-02	9.361E-03	.117	-4.7930E-02	3.137E-03
	Highly	Less/Non	6.427E-02	1.383E-02	.000	2.654E-02	.1020
		Competitive	5.146E-02	1.085E-02	.000	2.188E-02	8.104E-02
		Very	2.232E-02	1.175E-02	.317	-9.7264E-03	5.437E-02
		Most	-7.4297E-05	8.947E-03	1.000	-2.4480E-02	2.433E-02
	Most	Less/Non	6.434E-02	1.187E-02	.000	3.196E-02	9.672E-02
		Competitive	5.153E-02	8.197E-03	.000	2.917E-02	7.390E-02
		Very	2.240E-02	9.361E-03	.117	-3.1373E-03	4.793E-02
		Highly	7.430E-05	8.947E-03	1.000	-2.4331E-02	2.448E-02
Scheffe	Less/Non	Competitive	-1.2808E-02	1.336E-02	.922	-5.3984E-02	2.837E-02
		Very	-4.1946E-02	1.410E-02	.065	-8.5414E-02	1.521E-03
		Highly	-6.4268E-02	1.383E-02	.000	-.1069	-2.1636E-02
		Most	-6.4343E-02	1.187E-02	.000	-.1009	-2.7756E-02
	Competitive	Less/Non	1.281E-02	1.336E-02	.922	-2.8368E-02	5.398E-02
		Very	-2.9138E-02	1.119E-02	.148	-6.3623E-02	5.347E-03
		Highly	-5.1460E-02	1.085E-02	.000	-8.4886E-02	-1.8035E-02
		Most	-5.1535E-02	8.197E-03	.000	-7.6800E-02	-2.6269E-02
	Very	Less/Non	4.195E-02	1.410E-02	.065	-1.5214E-03	8.541E-02
		Competitive	2.914E-02	1.119E-02	.148	-5.3465E-03	6.362E-02
		Highly	-2.2322E-02	1.175E-02	.462	-5.8534E-02	1.389E-02
		Most	-2.2396E-02	9.361E-03	.221	-5.1247E-02	6.454E-03
	Highly	Less/Non	6.427E-02	1.383E-02	.000	2.164E-02	.1069
		Competitive	5.146E-02	1.085E-02	.000	1.803E-02	8.489E-02
		Very	2.232E-02	1.175E-02	.462	-1.3890E-02	5.853E-02
		Most	-7.4297E-05	8.947E-03	1.000	-2.7650E-02	2.750E-02
	Most	Less/Non	6.434E-02	1.187E-02	.000	2.776E-02	.1009
		Competitive	5.153E-02	8.197E-03	.000	2.627E-02	7.680E-02
		Very	2.240E-02	9.361E-03	.221	-6.4542E-03	5.125E-02
		Highly	7.430E-05	8.947E-03	1.000	-2.7502E-02	2.765E-02

* Mean difference is significant at .05 ...

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